MOTOR AGE

Vol. 3 No. 8

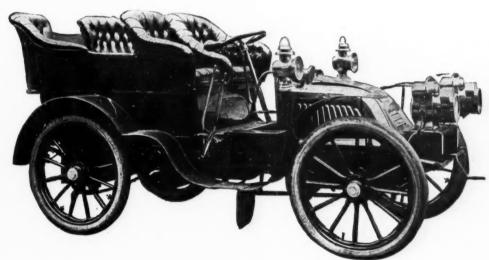
FEBRUARY 19, 1903

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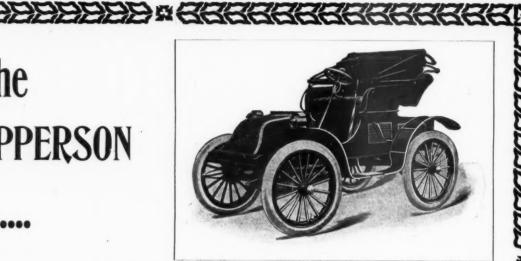
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WALTHAM. - MASS.

VOL. III. No. 8.

FEBRUARY 19, 1903.

\$2.00 Per Year.

THE CHICAGO EXHIBITION THE MOST GORGEOUS OF ALL

every standpoint Chicago is giving an American automobile show. In its typical design, in its preponderance of purely native types, in its catering to the de-mands of the many in contradistinction to those of the few,

in the breezy hustle of its exhibitors and in the personality of its attendance it is a refreshingly American function such as one would look for in the represent-

will have it put that waywith its more cosmopolitan population, with its closer mingling with foreign peoples and with its more submissive absorption of European ideas, has less of the obtrusive Americanism, less of the local pride that has made Chicago

great. So it is that the characteristics and the atmosphere itself of a New York function of this kind smack and breathe less conspicuously and intensely of the native soil and air.

NEW YORK ECLIPSED

When the show's floor sheet was balanced after the exits and entrances it was seen that in complete vehicle exhibitors Chicago had beaten New York by ten with a score of 91 to 81, besides furnishing substitutes for the vacancies caused by withdrawal or failure to secure space at all.

There were more exhibitors and some doubling up of the spaces. In round num-

bers, though, New York and Chicago, on the basis of the closing night's figures for the former and the opening night's figures for the latter, were tied at 150 exhibitors each all told. Additions made later in the week swell Chicago's total to a safe lead.

Not only in the matter of the total of complete vehicle makers and the number of manufacturers exhibiting new brands of automobiles does the Chicago show surpass that of New York, but it far outstrips it in the area of floor space covered by the exhibits. In the







Cleveland Automobile Co.'s Display

arena, restaurant, basement and gallery at Madison Square Garden there was a total of 27,534 square feet of floor space devoted to the exhibits. The area of the main hall of the Coliseum alone is 37,500 square feet. The annex, at a rough, safe guess, adds half as much more.

THE SPECTACLE IMPRESSIVE

With these figures and the fact that twothirds of the entire show was presented in one vast arena borne in mind, the comparative impressiveness in favor of Chicago's exhibition is readily to be understood.

The vastness of the Coliseum exposition appealed at once to those entering the building, and was the more appreciated when seen in its entirety from the galleries. There was a breadth, a sense of plenty of elbow and breathing room in marked contrast with the narrow aisles and crowded booths at Madison Square Garden. Vastness, decorations and all things considered, the Coliseum housed what looked like a real automobile show as contrasted with a quasi-automobile repository. Such were the comparative impressions of visitors to both shows.

"It certainly is a big show," was the firstsight tribute of the easterners.

"It's bigger than New York's," quickly followed

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There was no such eleventh hour hurry of preparation this time as marked the closing preliminaries last year. The Coliseum was given over to the management on Wednesday, with floor laid ready for the marking out, decoration and stocking of the booths. Last year the Coliseum arena had been left by the sportsmen's show a rough patch of ground abounding in rubbish heaps, dirt piles and excavations, and with no more time to get it in shape for the show's opening on Saturday afternon than was given this time to transform the unbroken floor into decorated booths and fill them with exhibits.

ATTENDANCE STARTS EARLY

There always will be delays and tardy arrivals. There were at New York. It seems not within the category of shows to have completeness at their opening. There were vacant spots and uncompleted decorations when the doors were thrown wide at two o'clock Saturday afternoon. Still there were not enough evidences of barrenness and incompleteness to offend the early visitors. By evening, when the crowd poured through the doors in unbroken streams, only the initiated or the very close observer could notice what was missing or what had been left undone.

From the very jump of the opening hour the awakening of a new and greater interest

George N. Pierce Co.'s Display

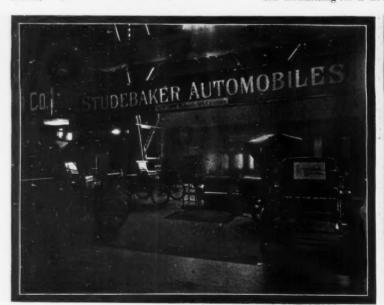
in the automobile exhibition on the part of the public as an expression of its growing enthusiasm for the automobile was unmistakable. Chicagoans quickly followed the lead of the Chicago press in giving to the western national automobile show the rank and recognition it deserves among the city's annual sport and trade fixtures. Last year's attendance records for an opening afternoon were quickly wiped out.

The early visitors were evidently made up to some extent of those who had awaited the show as an opportunity to buy; for reports of sales began to be noised about the Coliseum before the afternoon session ended.

DEALERS GALORE

The dealers were in the crowd, too. They had come early and had been in evidence for 24 hours preceding the opening, and intruded themselves on the exhibitors before the latter had completed their stands and were ready to talk business. Some of them had been disappointed in securing agencies at New York, and even with the score of new concerns looking for local representatives there was well grounded fear that many would-be automobile dealers might be compelled to pursue other lines of business until the new industry still further broadened its output.

With the fall of night came the beginning





Studebaker Bros. Mfg. Co.'s Display

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F. B. Stearns Co.'s Display

of a nasty snowstorm that made home firesides much more tempting Saturday evening resorts than the Coliseum when long journeys on the draughty elevated trains and crowded street cars had to be braved to reach it. Still, carriages, automobiles and cable cars deposited thousands at the Coliseum doors, against whose enthusiasm and curiosity to see the great show the inclement weather conditions availed naught. The attendance was conspicuously representative of Chicago's highest social life. Just as in New York, it was the horse show crowd over again. It was evident beyond dispute that society had taken unto itself the automobile. Despite Square Garden itself and had attempted little additional embellishment. Visitors to the New York show of 1902 when they came to Chicago criticized the management for its lack of provision of decorations. This criticism extended among the exhibitors as well. Last year's show, however, was experimental and economy was the policy. This year the Coliseum exhibition bears the stamp of a veritable fete d'automobile and not a mere showroom for prospective buyers.

STATELY AND GORGEOUS

The stately proportions, the graceful arches and the sweeping galleries of the Coliseum,

Add to these hangings and their colors the gleaming arches and glowing clusters of electric lights and one can form an idea of the artistic beauty of the enveloping canopy of the brilliant exhibit on the floor beneath.

THE COMPOSITE PICTURE

A bird's eye view of the show from the gallery on Saturday, even though an occasional electric sign was missing or had not been connected with the current, presented a gorgeous panorama of flashing metal and varnish, gay colors and dazzling lights. Elegantly attired laties in the bright hues of the present mode sauntered along the aisles or clustered about



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the storm, last year's first night's attendance figures were exceeded.

TYPICAL OF THE TRADE

It took but a single round of the booths to be impressed with the characteristics of the show. There were heavy, high-priced cars a-plenty; but runabouts and light-weight vehicles which lines America has itself devoted and in which excelled, prevailed. The mere soupcon of European exhibits appearing at but three of the stands only served to emphasize by contrast the almost unanimous predominance of American products.

HANDSOME COLISEUM

New Yorkers had trusted almost entirely to the architectural decorations of Madison than which this country has no grander amphitheater, would hardly seem to need anything to add to their impressiveness and artistic effect. There were decorations, though, and they lent a festal air to the whole and make of the show a function as contrasted with a mere mart.

The entire ceiling of the Coliseum main hole was bowered in hangings of alternate green and yellow. American flags were suspended from the center of the arch the entire length of the building. Draperies of the same colors were hung along the gallery above and below the seats. On the upper line clusters of the flags of all nations held them and on the lower they were pinned by dashes of red bunting.

THE COLISEUM MAIN HALL

the particularly striking stands. Above electric signs blazed and on all hands lighted lamps flashed forth from the vehicles. Hundreds of visitors availed themselves of the gallery to view the gorgeous sight.

INDIVIDUAL DECORATIONS

The International Motor Car Co.'s electric display was again the most brilliant and elaborate of the show, just as it was last year. In fact, the entire scheme of the 1902 stand decoration was reproduced. A great electric sign extended the whole length of the booth. Electric lights framed the sign bearing the company's title and Waverley and Toledo flashed in large script letters at either end. At the corners and either side of the en-





Graphite Johnson



J. A. Kingman



Elwood Haynes



E. R. Thomas



Dick Welles

trances lighted globes topped the iron poles marking them and from pole to pole encircling the whole was suspended a string of lights.

The Locomobile, Goodyear, Pierce, Mitchell, Firestone, Shelby, Electric Vehicle, Fisk, Winton, Franklin, Searchmont, Goodrich, Dasey, Brecht, Woods, Thomas and Westinghouse and Oldsmobile stands all had electric signs and N. A. A. M. in electric letters on the south gallery reminded the visitor that the National Association of Automobile Manufacturers was one of the promoters of the show.

In the annex the American Darracq Co.'s stand was made conspicuous by an electric "Darracq" and the St. Louis Motor Carriage Co. announced in blazing letters the whereabouts of "Rigs that Run."

FOREIGNERS ON HAND

Pre-eminently as the show was an American one, the foreign machines did not permit the American vehicles to monopolize all the attention of the visitors. In the Smith & Mabley section of the Ralph Temple and Austrian Co. stand a Panhard and a Mors served to remind the Yankees that there are still some others. Equally large crowds of admirers around the Darracqs in the annex and the De Dions shown by H. M. Grant still further emphasized the fact that American makers have invading rivals well able to spur them to their best efforts.

SUNDAY'S BLIZZARD

Sunday brought with it a blizzard that did its best to frostbite the enthusiasm the success and bright prospects of the opening night had aroused. A few early rising auto-fans and luckless trade journalists gathered at the Coliseum before noon, but there was little doing in the way of business talk and few of the covers were removed from the vehicles.

CROAKERS CBOAK

The driving wind and snow that greeted them set the croakers croaking and they could see only a rainbowless deluge of hard luck awaiting all whose business prosperity depended on the show's success. The Coliseum was deserted during the afternoon by all but the persevering scribes, while the arches of the hotel lobbies echoed the mournful cry of the I-told-you-so birds and the click of the lethean celluloids was heard in an occasional bed room and private parlor.

Nightfall came and the storm went. The hallelujah larks took their turn in caroling their glad refrain and silenced the calamity chorus. All hands went forth to spy out the land after the manner of their kind at these functions that they might be the better fitted for the serious business of the morrow.

COLD FOR TENDERFEET

It was cold, bitter cold on Monday and Tuesday, thought the Eastern tenderfeet; though the hardy Westerners put up the bluff that it was really fine training weather, and only hoped the Chicago public would put up the same bluff and back it up by going to the Coliseum in undiminished numbers to make it good.

A DAILY PRESS BOOM

Chicago's daily newspapers had stood by the automobile show on its merits and with commendable local patriotism, too. Their approving comments and reviews abnormally extended in the light of previous space devoted to these affairs, had their effect and the attendance figures were surprisingly large under the unfriendly weather conditions. As a matter of fact, Saturday's, Monday's and Tuesday's box office receipts were double each day the corresponding day's receipts of the year before, when the show was held a month later and in weather that had more spring to it than mere calendar say so.

SIGHTSEERS ABSENT

As might be expected, visitors whose interest and enthusiasm induced them to brave such an exhibition drill of Chicago's winter elements were no casual sightseers drawn to the show out of idle curiosity to look at automobiles, electric lights and one another. They came there because they wanted to see the motor vehicles. Demonstrators at the stands were accordingly surrounded by unaffectedly interested, and in most cases, technically intelligent questioners. This encouraged the showmen and bred an air of unconcealed satisfaction around the booths with the way things were going, and with bright hopes of substantial figures on the right side of their Chicago show balance sheet when the week should close.

To express the early-in-the-week trade situation negatively there were no hard luck stories, and there were no kicks, and when there are neither of these forthcoming from automobile showmen it is a fair assumption that things are coming their way.

BOSY SALES TALES

Individual statements of actual sales gathered in a fairly comprehensive tour through the stands on Tuesday would justify a more rosy and specific bulletin of trade conditions in this issue than the conservative generality here employed. A delay in making positive statements on this point until after the week is over will be more just to the show as a business proposition and avoid the danger of falling into erroneous and inaccurate statements on an important factor of the exhibition.

SELLING HANDICAPPED

Several conditions handicapped the sales this year. The weather during the early days not only necessarily largely reduced the attendance figures possible and probable with more favorable weather, but cut off exhibitors practically entirely from outdoor demonstration. Few people care to invest in such expensive luxuries as automobiles without trial of them except in the case of vehicles of established reputation above the average or following an ante-show test of them. Yet the "sold" cards at almost every stand indicated that sales had been made, and so backed up the almost universal statement that business had been done already to a satisfactory extent in some cases and to at least an encouraging degree in

CHICAGOANS TAKE TIME

"Chicagoans are slower buyers than New Yorkers," said one exhibitor. "We have done pretty near as well up to this early hour as we did last year, but we do the bulk of our trade the latter half of the week after buyers have had a chance to look the field over thoroughly before finally making up their minds."

"We have done mighty well under the adverse weather conditions," said John A. Kingman, of the Locomobile Co. of America, on Monday. "We sold \$20,000 worth of assorted steam and gasoline machines today. Our big day at New York was Thursday, and the end-week sales were far ahead of the early-



Chas. E. Durvea



A. L. McMurtry



Col. Pardee



R E. Olds

week ones. We expect that this will be our experience in Chicago."

A FRANK CRITICISM

"The Chicago show sales so far are not equal to those in New York," said another exhibitor, "and they will not be, and we have no right to expect that they will be, and no reasonable man here does. The automobile boom in the east is older than it is out here. has had a chance to grow, and so as a matter of course is bigger. The New York dailies have regular automobile editors and devote columns of space to the sport. This has its effect on public enthusiasm, and consequently on the volume of sales. Chicago papers, I see, are awakening this year to the importance of automobiling, and the trade is showing its appreciation by some advertising in them. When the motor vehicle becomes an accepted fact with the press of the west the automobile boom will be given the impetus it needs outside of the publicity of the trade press and the enthusiasm and missionary work of its devotees by word of mouth. The west outstripped the east in the sport and industry of cycling. Western factories are now building most of the automobiles, and the best of them, so far as recognized leadership goes, based on the volume of output. Westerners will not much longer let the easterners buy most of the automobiles the westerners build and be the leaders in automobiling as a sport."

MANY DEALERS ATTEND

Dealers are in attendance in large numbers. More than five hundred of their business cards had been presented at the bureau of information up to Tuesday noon. At five o'clock of the same afternoon the trunk line representative at the Coliseum had vised four hundred return tickets, which, of course, included exhibitors, dealers and visitors; but Tuesday is an early day in the week. There was talk at several of the stands of large delegations from western points being on their way to the show.

LITTLE AGENCY TALK

The agency question does not intrude itself much in show gossip and discussion. It was



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all agency talk last year. Then a practically unoccupied business territory was being preempted. Each agent placed an order for one or a dozen or a score of machines, which made a great aggregate and caused much talk. Now established agents have placed their 1903 orders to a very considerable extent direct with the factories, and the transactions have not gone through the stands at the shows. Undoubtedly many fearing another automobile famine went to New York to get their orders in early. Now agency placing is confined to the new concerns in the business and to makers seeking agencies in territory hitherto partly or altogether uncovered, though the number in the latter class is small owing to the preference of the manufacturer in favor of assuring agents already established of a full



supply rather than in the direction of seeking expansion in new and untried territory.

INTERNATIONAL RACE CRACKS

H. S. Harkness, a candidate for the American team in the international cup race, arrived at the show on Tuesday. L. P. Mooers, another candidate, was already on hand. Alexander Winton was kept at the Cleveland factory by rush of business, and C. W. Matheson, of Grand Rapids, had not arrived with his exhibit up to Tuesday afternoon.

GOOD ROADS CONVENTION

The show management will give a smoker to the visiting tradesmen at the Coliseum Assembly hall on Thursday evening.

Friday evening will be devoted to the good roads convention at the Auditorium. The meeting promises to be a monster affair. It will be under the auspices of the National Good Roads Association, the National Association of Automobile Manufacturers, and the Chicago Automobile Club.

ALDERMEN VISIT SHOW

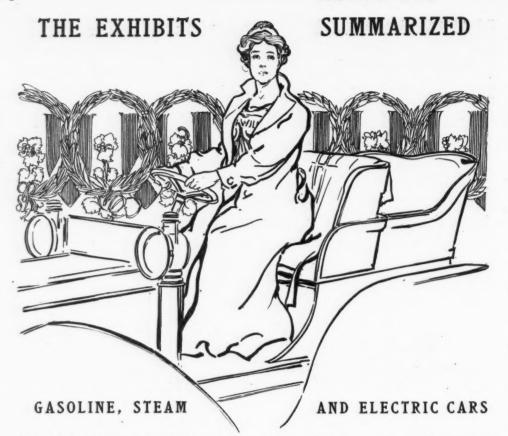
The Chicago Automobile Club conceived the idea of a diplomatic coup and invited the aldermanic judiciary committee to attend the show on Monday evening, view the wonders and gap at the magnitude of the motor vehicle industry.

The aldermanic solons, following a board meeting, came to the show; but the club's reception committee had somehow erred and were not on hand. The aldermen, fifty strong, fled from the wrath their guilty consciences told them was their due, and took to where the woods were last year at the north end of the building.

Here they were found huddled in a perplexed, awe-stricken and thirsty bunch. Some C. A. C. derelicts were hunted up and straightway formed an escort of honor to the bar in a far corner whose locality chanced to be known to a few bibulists. In ten minutes automobiles, automobilists and automobiling were all right from the aldermanic viewpoint, and any city father who ventured to curb their privileges was all wrong.



THOMAS B. JEFFERY CO.'S DISPLAY



Woods Motor Vehicle Co.—Chief among the several handsome, fashionable electric cariages is the round front brougham, both for inside and rear seat operation.

FLINT AUTOMOBILE Co.—One model of the Roadster, the vehicle made by this firm, is shown. It is a light runabout and shows the result of excellent workmanship.

MEAD CYCLE Co.—Shows the Murray motor car. Two vehicles are exhibited, one complete and the other with back removed to show operating mechanism.

RAPID MOTOR CAR Co.—Shows the latest car to be produced in Grand Rapids. It is of the tonneau design after French lines and is attracting considerable attention.

WATERLOO MOTOR WORKS.—Three models of the well-known Duryea car are shown. A tonneau with summer top, a four-wheel touring car and a three-wheeled runabout of the regular Duryea design.

BUFFALO ELECTRIC CARRIAGE Co.—Three models of the Buffalo car, two runabouts and a go!f brake, the latter a stylish vehicle, with yellow running gear, are shown.

KIRK Mrg. Co.—In addition to the Yale touring car shown at New York a chassis showing the numerous novelties in detail construction is displayed.

WISCONSIN WHEEL WORKS—In addition to the well-known Mitchell motor bicycle are shown a small runabout with air-cooled motor and a heavier roadster with single cylinder, water-cooled motor.

MARBLE SWIFT AUTOMOBILE Co.—A complete car of the middle weight class, with two cylinder motor in front, is used to demonstrate the application of the Marble-Swift friction transmission.

AUBURN AUTOMOBILE Co.—A heavy runabout with tonneau attachment for city use is shown. It is of the accredited single cylinder construction, with planetary gear transmission. The batteries and coils are in a box front of motor, bonnet shape.

KAMMANN MFG. Co.—An aluminum car in which it is said there is not a piece of wood

is shown by the company. It is called Jack Frost, and some remarkable claims are made for it.

SANDUSKY AUTOMOBILE Co.—The Sandusky car, which was almost continuously in operation and drew considerable attention to the company's exhibit, which was made conspicuous by an illuminated sign showing the name of the car.

The American Darracq Automobile Co.— The most attractive exhibit in the annex and one of the most striking in the show is that of this company. Three cars are shown, one a luxuriant limousine, together with the beautifully finished Darracq chassis, which created so much interest at the New York show. THE UNION AUTOMOBILE Co.—One model of the Union car, a vehicle listing at \$1,200 and designed on the regular runabout order, is shown.

INTERNATIONAL MOTOR CAR Co.—With the most handsomely embellished exhibit, this company is the only maker exhibiting cars of all three types, steam, electric and gasoline. The Waverley electrics and Toledo steam and gasoline cars are the same as displayed at New York.

THE OLDS MOTOR WORKS—This company is represented by the Oldsmobile Co., of Chicago, which shows the regular Olds, the new touring car and the newer coupe, as displayed at the eastern exhibition.

HAYNES-APPERSON Co.—A surrey, phaeton and runabout of the latest growth are associated with the patriarch of this well-known family—a light gasoline car built by Elwood Haynes in 1893. To show that it was a successful experiment it is frequently run with the wheels jacked up.

CLEVELAND AUTOMOBILE Co.—The Cleveland touring car and the Cleveland roadster are both shown in several finishes, the exhibit being substantially the same as that at New York.

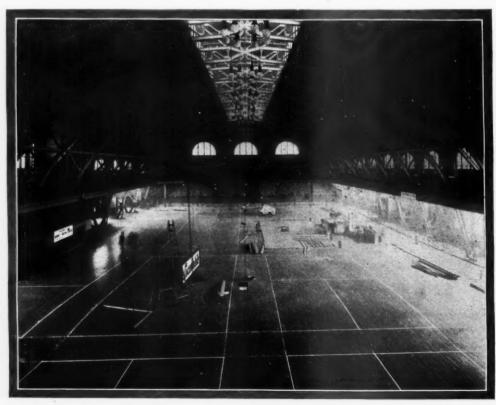
KNOX AUTOMOBILE Co.—The waterless Knox exhibit was brought intact from New York, including the demonstration porcupine air-cooled motor on a frame.

ELMORE Mrg. Co.—Two-cycle engines—the only ones prominently in the American automobile trade—are shown on the Elmore runabout and on the new two-cylinder tonneau touring cars.

FRIEDMAN AUTOMOBILE Co.—In addition to the Friedman road wagon with the well-known friction drive, is shown a similar pattern with a planetary gear transmission.

STANDARD MOTOR VEHICLE Co.—The new car, which is to have a four-cylinder horizontal motor with the opposed pistons rigidly united, was not completed and only the running gear is shown.

SEARCHMONT AUTOMOBILE Co.—Both sizes of



MOTOR AG







Messrs, Gilson and Gillard



Mr. Austrian



Fredonia Thomas



W. H. Pirrong.

the new Searchmont touring car are shown by the Githens Bros. Co., Chicago, agents.

J. Stevens Arms & Tool Co.—A 1902 and a 1903 pattern of the seat starting, hill climbing Stevens-Duryea gasoline car are displayed. There is little difference between them except in detail.

Frank P. Illsley—As western agent he shows several patterns of the Autocar, made by the Autocar Co., the Northern runabout made by the Northern Mfg. Co. and the Indian motor bicycle made by the Hendee Mfg. Co.

SHELBY MOTOR CAR Co.—The reconstructed Darling, now the Shelby, is shown in runabout and touring car patterns. Both have the double piston horizontal motor, one in single and the other in double cylinder style.

PITTSBURG REDUCTION Co.—Aluminum castings for all parts to which aluminum has been adapted in automobile construction, principal among which are bodies, bonnets, motor crank casings, transmission gear cases and a new aluminum radiator.

THOMAS B. JEFFERY & Co.—Rambler road wagons are shown in about the same manner as at New York, but more roomily.

NATIONAL MOTOR VEHICLE Co.—The pet of the big National electric line shown is a new one on roadster lines, with the battery divided, half of the cells being under the rear body and half under a brass bonnet in front. It is distinctly an automobile, even to wheel steering.

THE CADILLAC AUTOMOBILE Co. OF ILLINOIS

—This agency shows the newly popular Cadillac runabout and the little air-cooled motor

Orient buckboard.

NATIONAL AUTOMOBILE & MOTOR CO.—One of the new western makers shows touring cars of French persuasion in design, with vertical motors having mechanical inlet valves and with a novel combination of the multi-tubular and honeycomb radiators.

BARTHOLOMEW Co.—This Illinois concern shows the Glide runabout, one of whose prominent features is an extremely flexible frame.

Fredonia Mfg. Co.—A runabout and a moderate size tonneau car, both with single cylinder, horizontal motors and planetary gear transmission and a chassis of the smaller machine, are displayed.

St. Louis Motor Carriage Co.—One model of the St. Louis runabout and the St. Louis motor, cut away to show operation of the valves, are shown.

CHICAGO MOTOR CYCLE Co.—The combination hot air or caloric engine made by this firm is exhibited in operation and is attracting considerable attention. A complete car fitted with the engine is also shown.

T. L. TINCHER—The Tincher motor car, a new product modeled after French lines and attractively finished in red and black, is shown by N. S. Tincher.

COLUMBUS MOTOR VEHICLE CO.—The new Santos-Dumont is shown. It is a tonneau body touring ear, driven by a two-cylinder horizontal motor under the body.

MARR AUTOCAR Co.—This new Detroit company shows a runabout of the single cylinder variety, having such features as adjustable tilting steering wheel post, one lever speed gear control and ignition governor.

JONES-CORBIN Co.—The little big car with vertical De Dion motor in front, which made its debut at the New York show.

MUNCIE WHEEL & JOBBING Co.—Strong two or four passenger gasoline car, whose steering wheel performs the additional function of starting the motor, and a line of wood wheels are shown.

DE DION-BOUTON Co.—L. M. Grant, Chicago agent for these French cars, shows a 9-horse-power, two-cylinder tonneau and a brougham with driver's seat in the rear.

CONRAD AUTOMOBILE Co.—The Conrad gasoline tonneau and the Conrad runabout with collapsible surrey rear seat, are shown, "side by each," as at New York.

CHELSEA MFG. Co.—The Welch Tourist, a rakish tonneau with vertical two-cylinder motor in front, is shown here for the first time.

Jackson Automobile Co.—The Jaxon steam car is characterized among other things by the use of the Studebaker-Burnell generator for using either gasoline or kerosene, and a rotary valve engine. Two gasoline cars, one of which has a horizontal air-cooled two-cylinder motor in front, are also shown.

H. H. Franklin Mfg. Co.—Franklin air-cooled motor cars in red, black and white are displayed.

RALPH TEMPLE & AUSTRIAN Co.—Collectively in charge of the Smith & Mabley, U. S. Long Distance, Franklin and Woods displays, being Chicago agent for these makers.

PACKARD MOTOR CAR Co.—Shows a standard single cylinder model complete and one with body open to display mechanism; also a four-cylinder upright motor machine, with a hand-some limousine body. The chassis of this is said to be the same as the striped chassis shown at New York.

CENTAUR MOTOR VEHICLE Co.—Two Centaur electric runabouts, both with motor under body and chain drive. Pardee & Co., Chicago agents, are in charge of this exhibit, as well as those of the Packard Motor Car Co. and the American Motor Carriage Co.

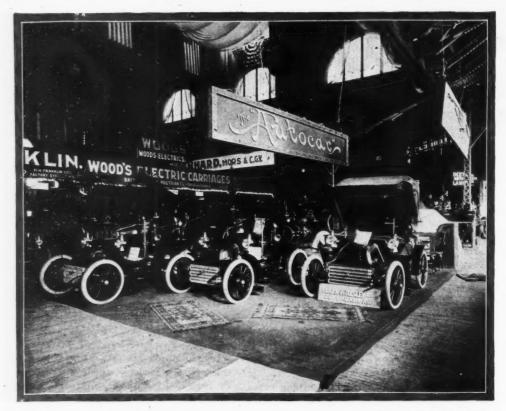
AMERICAN MOTOR CARRIAGE Co.—In addition to the complete American car, a chassis with regular stock finish is shown. The clean-cut arrangement of the power elements is notable.

WINTON MOTOR CARRIAGE Co.—The exhibit is the same as that at New York except that the Bullet is missing. One of the touring cars is kept running to show its freedom from excessive noise and vibration.



MOTOR AG

THE OLDSMOBILE DISPLAY



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LINDSAY-RUSSELL Co. — Running gears, bodies, axle sets and a complete chassis of a stout little runabout of the single cylinder planetary gear type are supplemented by a complete runabout made by Wayman & Murphy from these parts.

E. R. Thomas Motor Co.—The two patterns of the Thomas road cars—both tonneaus—and a chassis of the larger model, which has sliding gear transmission and other refinements of higher priced cars; also the new spring frame motor bicycle are displayed.

ELECTRIC VEHICLE Co.—While replete with electric carriages put in the highest stage of the carriage builder's art for conventional purposes, the star of this exhibit is the new Columbia gasoline touring car. In appearance it is fetching indeed, being one of the few extremely large cars exhibited.

F. B. STEARNS & Co.—In the matter of quiet running the Stearns company claims high honors and shows an intention to "make good" with a constantly running touring car from which the body is removed. A Suburban Stearns completes the display.

George N. Pierce & Co.—With the two patterns of the Pierce motorette as popular priced cars this company fills its line with the Arrow motor car, a strong, moderate weight tonneau car, which was given its public introduction at the eastern show.

STUDEBAKER BROS. MFG. Co.—With two each of its runabout and Stanhope patterns this company demonstrates its position in the stylish electric carriage field and promises e'er a next show a full line of fashionable equipages. Some voltage motors hung under the body, but on the tubular frame are featured.

PEERLESS MOTOR CAR Co.—Beside the regular two-cylinder Peerless touring car there is a large four-cylinder machine—the same as the racer displayed at New York except as to body and finish. There is also a chassis of this model.

APPERSON BROS.—A better space than was securable at New York allows the good display

THE AUTOCAR DISPLAY

of three Apperson touring cars, all of which have the well-known double cylinder horizontal motor and sliding gear construction.



MOTOR AGE

The Welch

FANNING Mrg. Co.—One of the standard Fanning electric runabouts shares the space with the brand new tonneau gasoline car which, built on French lines, is a surprise when the lifting of the bonnet discloses a vertical aircooled motor, with large cooling fan.

LOCOMOBILE Co. OF AMERICA—Surrounding a case full of competition trophies are all of the prominent patterns of Locomobile steamers and two complete samples and a chassis of the gasoline touring car.

PRESCOTT AUTOMOBILE Co.—Three of these Metropolitan steamers from an important part of the steam vehicle representation. A list of their endurance test winnings backs up their meritorious appearances.

THE GENERAL AUTOMOBILE & MFG. Co.—The regular General roadster is shown, both with and without the detachable tonneau. The large touring car is yet not ready for formal introduction.

SMITH & MABLEY—A 10-horsepower Panhard and an 8-horsepower Mors represent these importers.

U. S. Long DISTANCE AUTOMOBILE Co.—Two each of the large vertical motor touring car and the smaller horizontal motor car are shown, all in stylish appointment and finish.

HOFFMAN AUTOMOBILE & MFG. Co.—Both the Hoffman flash boiler steam car and the newer gasoline car are shown, as at the New York and Cleveland shows.

PARTS AND APPURTENANCES

BADGER BRASS WORKS—From a black background and numerous racks the line of solar acetylene lamps displayed at New York shine forth to illuminate the original painting of the Solar poster.

VEEDER MFG. Co.—Display of Veeder cyclometer, odometers and the new Veeder tachomeof Exide storage battery cells and panel of all separate parts, as shown at New York.

SHELBY STEEL TUBE Co.—Line of Shelby seamless tubing in all sizes and shapes adaptable to automobile construction.

TENNANT AUTO TIRE Co.—A new punctureproof tire, having a steel plate embedded in the tread and cushions of sponge rubber at the sides is shown by this company.



MOTOR AGE

THE STATELY PACKARDS

THE CARS AT THE CHICAGO SHOW

ARE WORTH AT RETAIL, ON A BASIS OF ONE EACH FOR EVERY MAKE OR CONSTRUCTIONALLY DISTINCT STYLE OF SAME MAKE

\$1.22 a pound for gasoline cars \$1.10 a pound for electric cars

\$1.11 a pound for steam cars \$1.11 a pound for cars of all classes

NEW YORK

A Composite Gasoline Car

with specifications secured by the majorities and pluralities of certain types of construction at each of the two Shows would have

CHICAGO

Wood wheels.
Double tube tires.
Angle or channel frame.
Wheel steer,
Horizontal motor.
One cylinder,
Batteries for ignition.
Motor under body.
Gravity lubrication.

Suction inlet valves.
Planetary gear transmission.
Single chain drive.
Spur differential.
Jump spark ignition.
No governor.
Continuous coil radiator.
Pump circulation.

Wood wheels, Double tube tires. Angle or channel frame. Wheel steer. Vertical Motor. Two cylinders. Batteries for ignition.

Motor in front.

Mechanical lubrication.

Suction inlet valves.

Sliding gear transmission.

Single chain drive.

Spur differential.

A Composite Electric Car

with specifications secured in the same manner would have

CHICAGO

Wood wheels.
Double tube tires.
Tubular frame.
Lever steer.
High voltage motor.

Gear drive.'
Single motor.
Divided battery.
Motor hung on ax'e.

Wood wheels.
Single tube tires,
Tubular frame.
Lever steer,
Low voltage motor.

Chain or gear drive.
Single motor.
Divided battery.
Motor under body.

A Composite Steam Car

with specifications secured in the same manner would have

CHICAGO

Wood wheels.
Double tube tires.
Tubular frame.
Lever steer.
Fire tube boiler.
Boiler under body.
Engine under body.

No automatic air regulator. Automatic fuel regulator. Pilot light. Automatic lubrication. No condenser. No steam water pump. Automatic water regulator. Wood wheels.
Double tube tires.
Tubular frame.
Lever steer.
Fire tube boiler.
Boiler under body.
Engine under body.

NEW YORK

Automatic air regulator.
Automatic fuel regulator.
Pilot light.
Automatic lubrication.
No condenser.
No steam water pump.
Automatic water regulator.

MECHANICAL TENDENCIES AT THE SHOWS

The following per centages are compiled from the 72 constructionally different styles of gasoline cars, 10 of electric and 5 of steam at the Chicago show, as compared with the 65 constructionally different styles of gasoline cars, 8 of electric and 11 of steam at the New York show.

GASOLINE

ELECTRIC

	AT	AT NEW
	AT NEW	
	ICAGO YORK	CHICAGO YORK
	R CENT PER CENT	PER CENT PER CENT
Wood Wheels	76 87	Wood Wheels 80 63
Wire Wheels	14 9	Wire Wheels
Tubular Wheels	IO 4	Tubular Wheels
Single Tube Tires	24 21	Single Tube Tires 20 38
Double Tube Tires	76 79	Double Tube Tires
Solid Tires		Solid Tires 20 25
Tubular Frame	10 21	Tubular Frame 50 50
Angle or Channel Steel Frame	72 64	Angle or Channel Steel Frame 40 25
Wood Frame	18 15	Wood Frame 10 25
Wheel Steer	72 79	Wheel Steer 20 None
Column Steer	5 3	Lever Steer 80 100
Lever Steer	23 18	Low Voltage Motor 30 50
Vertical Motor	41 60	High Voltage Motor 70 50
Horizontal Motor	59 40	Chain Drive to Wheels 30 50
One Cylinder	44 33	Gear Drive to Wheels 70 50
Two Cylinders	36 41	Double Motor
Three Cylinders	4 3	Single Motor 70 75
Four Cylinders	16 23	Divided Battery 80 50
Magneto or Dynamo	5 8	Motor Hung on Axle 50 38
Batteries	75 68	Motor Hung from Body 20 50
Both	20 24	Motor Hung on Frame 30 12
Mortor Front :	39 54	
Mortor Front :	39 · · · · · 54 61 · · · · 46	STEAM
Mortor Front :	39 · · · · 54 61 · · · · 46 30 · · · · 30	Wood Wheels 40 72
Mortor Front :	39 · · · · 54 61 · · · · 46 30 · · · · 30 39 · · · · 61	STEAM Wood Wheels 40 72 Tire Wheels 40 18
Mortor Front :	39 · · · · 54 61 · · · · 46 30 · · · · 30 39 · · · · 61 22 · · · · 19	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10
Mortor Front :	39 54 61 46 30 30 39 61 22 19 8 6	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45
Mortor Front :	39 54 61 46 30 30 39 61 22 19 8 6 38 38	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55
Mortor Front :	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None
Mortor Front: Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36
Mortor Front: Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46
Mortor Front: Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18
Mortor Front: Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36
Mortor Front: Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Final Drive	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 60 72 Flash Boiler 20 10
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Double Chain Final Drive	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 10
Motor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive Spur Gear Final Drive Spur Gear Final Drive	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 10 Boiler under Body 100 82
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive Make and Break Spark Jump Spark	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20 80	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 10 Boiler under Body 100 82 Engine under Body 100 90
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive Make and Break Spark Jump Spark Ignition Governor	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20 80	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 10 Boiler under Body 100 82 Engine under Body 100 90 Automatic Air Pressure Pump 40 82
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive Make and Break Spark Jump Spark Ignition Governor Throttle Governor	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20 80 10 25	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 10 Boiler under Body 100 82 Engine under Body 100 90 Automatic Air Pressure Pump 40 82 Automatic Fuel Regulator 100 82
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Double Chain Final Drive Make and Break Spark Jump Spark Ignition Governor Throttle Governor Continuous Coil Radiator	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20 80 10 25 59	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 10 Boiler under Body 100 82 Engine under Body 100 90 Automatic Air Pressure Pump 40 82 Automatic Fuel Regulator 100 82 Automatic Water Regulator 60 45
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive Make and Break Spark Jump Spark Ignition Governor Throttle Governor Continuous Coil Radiator Header Radiator	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20 80 10 25 59	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 18 Engine under Body 100 82 Engine under Body 100 90 Automatic Air Pressure Pump 40 82 Automatic Water Regulator 100 45 Pilot Light 100 00
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive Make and Break Spark Jump Spark Ignition Governor Throttle Governor Continuous Coil Radiator Header Radiator Honey-Comb Radiator	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20 80 10 25 59 12	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 10 Boiler under Body 100 82 Engine under Body 100 90 Automatic Air Pressure Pump 40 82 Automatic Water Regulator 100 82 Automatic Light 100 90 Auto
Mortor Front Motor Back Motor Back, Imitation Motor Bonnet Mechanical Lubrication Mechanical Inlet Valves Air-Cooled Motor Sliding Gear Transmission Sliding Clutch Spur Gears Planetary Gear Transmission Friction Clutch Spur Gears Direct Drive Friction Drive Spur Differential Bevel Gear Differential Bevel Gear Final Drive Single Chain Final Drive Spur Gear Final Drive Spur Gear Final Drive Make and Break Spark Jump Spark Ignition Governor Throttle Governor Continuous Coil Radiator Header Radiator	39 54 61 46 30 30 39 61 22 19 8 6 38 38 7 19 40 36 10 6 1 1 4 None 75 55 25 45 11 28 68 52 16 17 5 3 20 80 10 25 59	STEAM Wood Wheels 40 72 Tire Wheels 40 18 Tubular Wheels 20 10 Single Tube Tires 40 45 Double Tube Tires 6c 55 Solid Tires None None Tubular Frame 80 36 Angle or Channel Steel Frame None 46 Wood Frame 20 18 Wheel Steer 20 36 Lever Steer 80 64 Water Tube Boiler 20 18 Fire Tube Boiler 20 18 Fire Tube Boiler 20 10 Boiler in Front None 18 Engine in Front None 18 Engine under Body 100 82 Engine under Body 100 90 Automatic Air Pressure Pump 40 82 Automatic Water Regulator 100 45 Pilot Light 100 00

stone side wire solid tire is the keynote of a booth tastefully decorated in red.

WHITNEY MFG. Co.—As at New York a glass case full of Whitney block and roller chains running in a series of graduated speed sets forms the feature of the display.

STANDARD WELDING Co.—In the midst of numerous samples of electric welding are samples of electrically welded automobile wheel rims.

GRAY & DAVIS—Both acetylene and oil lamps in the most up-to-date French shapes are shown. The gas headlight is an especially clever conception.

Jos. DIXON CRUCIBLE Co.—From the host of uses to which this company has adapted graphite a special line of lubricants put up for automobile lubrication have been selected.

Rose Mrg. Co.—Neverout lamps, from a tiny headlight of runabout usefulness to an 1,800-candlepower headlight, rightly named the Giant, are shown.

Timken Roller Bearing Axle Co.—The well-known Timken roller hub bearings, especially of the heavier patterns, are accentuated. Their ease of running and accuracy of adjustment are demonstrated by hubs mounted on stub axles.

Brennan Motor Co.—The Syracuse company does not show its new touring car, but makes an extensive display of the line of Brennan motors, which are sold to the trade.

TWENTIETH CENTURY MFG. Co.—Fred Castle brought the whole display of Twentieth Century lamps intact from New York and hence smiles forth again from the same velvet setting.

FISK RUBBER Co.—This display assists in maintaining the reputation of the tire companies for handsome as well as commercially important exhibits. The new mechanically fastened Fisk double tube tire is the leader.

A. H. Funke—A circle of horns in the center of which is a huge acetylene headlight form the background of Mr. Funke's exhibit. A complete line of lamps, horns, Baldwin spark plugs and generators is shown.



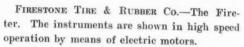
MOTOR AGE

WESTERN STORAGE BATTERY Co.—Is showing the battery made by the company and also all the parts which enter in its construction.



The M

CHICAGO STORAGE BATTERY Co.—A small runabout mounted on rollers and fitted with



THE THOMAS TONNEAU

ELECTRIC STORAGE BATTERY Co.—The exhibit the company's batteries is being run continuously to show the life and durability of the cells. Above the vehicle is a dial showing the miles as they are reeled off by the car on the rollers.

MILLER & KNOBLOCK—Showing magnets and spark coils.

THE JOHN F. McCanna Co.—An attractive and interesting display of lubricators shown in operation by means of a concealed electric motor made the firm's exhibit of interest.

WESTINGHOUSE ELECTRIC & MFG. Co.—Westinghouse generators, switch boards, etc., and complete charging sets for the users of electric carriages.

NATIONAL CARBON Co.—In a little red house of tapestry the ignition outfits are shown in all styles.

NATIONAL ENGINE Co.—Shows in operation a charging plant for electric carriages. The generator is driven by a gasoline motor.

HARTFORD RUBBER WORKS—The Hartford single tube, Dunlop detachable and Turner solid tires are shown in all sizes.

R. E. Deitz Co.—The new acetylene headlight, the introduction of which at the New York show brought the Dietz company into new popularity, is, of course, the feature.

BRISCOE MFG. Co.—This concern, an experienced company in sheet metal work, has entered the automobile field in an extensive manner with motor bonnets, water radiators, tanks, mufflers and fenders as leaders. A full line is shown.

INDUCTION COIL Co.—This concern shows the Mueller spark coil which was brought out several years ago by Mr. Mueller, but never before vigorously pushed.

B. F. GOODBICH Co.—Substantially the same display of Goodrich tires and framed Goodrich girls as made at New York. Detachable tires are shown prominently.



MOTOR AGE

THE DISPLAY OF COLUMBIAS

PARDEE & CO. REPRESENTATIVES CHICAGO.



Jim Becker



Loco Plummer



W. W. Bennett

AUTOMOBILE EQUIPMENT Co.—A line of accessories especially in the way of leather cases and attachments.

HINE-WATT MFG. Co.—The same system of automatic gas and water feed regulation which made the Columbia gas lamp famous in the bicycle field has been adapted to a full grown automobile headlight of French shape.

K. Franklin Peterson.—Shows collectively the lines of the Baldwin Chain & Mfg. Co. chains; American Roller Bearing Co., roller hubs bearings; Brown-Lipe Gear Co., spear gear differentials; Midgley Mfg. Co., tubular wheels, and Cleveland-Canton Spring Co., springs.

P. J. Dasey Co.—The largest exhibit of parts and appurtenances. Contains samples of the large line of goods for which the company is selling agent; the various Dasey vertical and horizontal motors, the new Monarch runabout and several patterns of the new water cooled Rutenber motors.

DAYTON ELECTRICAL Mrg. Co.—The King spark timer, operating in connection with an Apple igniter, to furnish ignition for four cylinders, demonstrates the character of the company's two leaders in the ignition goods line.

BRECHT AUTOMOBILE Co.—A show finished Brecht reachless running gear in nickel and a divided front seat body, with brass motor bonnet, are shown.

DIAMOND RUBBER Co.—A leather furnished business office renders the Diamond tire display handsome. Diamond tires are on hand in all patterns to render it profitable.

HERCULES ELECTRIC MFG. Co.—The Wizard spark generator, for use with the jump spark system of ignition, is shown in operation.

H. L. HOFFMAN MOTOR Co.—The Hoffman vertical two-cyl-

inder and a single cylinder horizontal motor are shown. Neither is novel in construction, attention having been directed to careful design and construction on approved lines.

G. & J. Tire Co.—A roomy stand with handsome furnishings and with only samples to show the greatness of G & J tires; in appearance a well appointed office.

WARNER DIFFERENTIAL GEAR Co.—Shows a spur differential gear.

IMPERIAL WHEEL Co.—A ball bearing artillery wheel possessing several new features and durability is being introduced to the trade by this firm.

VESTA ACCUMULATOR Co.—The attractive display of electric headlights for light and heavy automobiles make the exhibt one of the bright spots in the annex.

PORTER BATTERY Co.—The vehicle fitted with Porter batteries, and which covered 187 miles at one charge, is the prominent feature of the exhibit. Battery cells and parts are also shown.

STANDARD CARRIAGE LAMP Co.—Is showing a complete line of acetylene head and side lights of various sizes and finish.

H. W. Johns-Manville Co.—Samples of asbestos covering for boilers, together with various styles of asbestos for use on steam and gasoline automobiles, are shown.

BARTON BOILER Co.—Shows the new Barton flash boiler, which is claimed to be a remarkably quick steamer and especially responsive to change of load.

STANDARD ANTI-FRICTION EQUIPMENT Co.— Is exhibiting various sizes of the Beasley tire with numerous sections showing the construction and cushioning qualities of the tire.

CUSHMAN MOTOR Co.—Is exhibiting several models of the Cushman two-cycle engine, which is designed for stationary and marine uses. It is shown in operation running a small electric generator.

TURNER BRASS WORKS—A most complete line of gasoline torches and lamps, together with the Turner carbureters, is shown.

E. J. WILLIS—A full line of lamps, horns and fittings, including the Herz plug and the Spitdorf spark coils, are shown. The immense spark coil, which attracted considerable attention at the New York show, creates considerable comment among the numerous passers-by.

Motsinger Device Mfg. Co.—The well-known auto-sparker made by this firm is shown attached to a gasoline motor, which is started and run by the device.

GOODYEAR TIRE & RUBBER Co.—Line of Goodyear solid, single tube and double tube automobile tires in booth backed with Goodyear girl and other posters.

ELECTRICAL CONTRACT Co.—Ignition devices and small electrical novelties.

HYATT ROLLER
BEARING CO.—Roller
bearings applied to
rear axles and specimens of parts used on
them, including the
spiral self-adjusting

rollers. This novel roller is the principal feature of the bearing.

The Yale Exhibit

Brandenburg Bros. & Alliger—They are showing the Thor motor bicycle outfit described recently in Motor Age and the four-cylinder vertical motor made by H. L. F. Trebert & Co.

RACINE BOAT MFG. Co.—A Racine launch with top and fitted in a luxuriant manner is shown by this company.

GITHENS BROS. Co.—A beautiful Lozier launch and a Lozier marine motor, together with the Buffalo electric carriage, are shown by this Chicago house.

Wagner Cycle Co.—Shows one model of the Wagner motor cycle and one model of the Wagner motor tandem, both having the new type of frame originated by the company.

MOTOR CYCLE MFG. Co.—A stand showing the latest model of the Marsh motor cycle, with the parts entering into its construction, constituted this firm's exhibit.

THE MERKEL MFG. Co.—The Merkel motor bicycle shown is characterized from that of last year by a triple steering head, curved lower reach, flat belt, Regas cushion rear frame and lower center of gravity.



Frank Weston



L. P. Mooers



Hartford Tire Kirkpatrick

THE TALKING POINTS OF DIFFERENT AUTOMOBILES

WHAT THE EXHIBITORS SAY OF THEIR CARS
WHEN MAKING SALES WAY



THE AUBURN—Its low price and stylish appearance, together with the high quality of material and simplicity of operation, long wheel base, easy riding and handsome upholstery, make it one of the most attractive propositions on the market.

The Bartholomew—The mounting of the power plant on an independent set of springs, pivotally suspended so that there can be no cramping or binding of shafts—a feature which will double the life of the machine and which is not found on any other make.

The Yale—Its extreme simplicity—no gaskets, float feed, needle valves or gasoline pumps to get out of order. The fact that it is a Yale product is a guarantee of the workmanship entering into the construction.

THE PIERCE—The horsepower in connection with the weight, being direct gear driven with no loss of power. Its graceful outline, easy riding quality and extremely flexible construction.

The Stearns—Its power with its extreme simplicity, ease of control and elegant finish. Its powerful engine regulated from 100 to 1,000 revolutions per minute by the simple touching of a small foot button. It is Stearns quality throughout.

Toledo Gasoline—That the car is thoroughly up-to-date, comprising all the wants of the most exact automobilist. The quality of workmanship and finish having elicited the highest commendation from discriminating buyers.

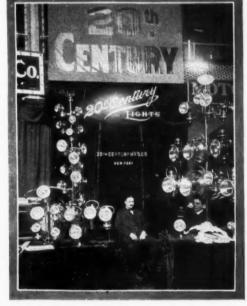
THE NATIONAL ELECTRIC—The unusual battery equipment having greater mileage than most batteries and the extremely simple rear construction and easy control of the car, a single lever with push button reverse being the sole lever used.

THE FRIEDMAN—Its simplicity of construction, flexibility and ease of control, strength, and beauty of outline, and comfortable riding qualities.

THE ELMORE—The simplicity of the mechanism, the two-cycle double cylinder engine being the most powerful of its size, with less parts than any single cylinder engine made.

THE CLEVELAND—That it is a constant service car, built on practical lines, with few parts and no frills; with little to get out of order, little to watch and care for and with an easily mastered system of control.

THE STUDEBAKER—The suspension of the motor on the running gear above the springs in the center of the vehicle, tubular frame using



MOTOR AGE

20th Century Lamps

the semi-elastic front spring, insuring riding under all conditions.

THE DE DION—That the motor is known over the world and is a standard article name being sufficient guarantee of its reliability and durability under all conditions.

THE APPERSON—That the builders have been actually engaged in the manufacture of automobiles since 1893 and that the purchasers are insured a vehicle of the most modern design with improvements not found on other cars.

THE PEERLESS.—That it has vertical motor, mechanically governed, mounted in front, universal shaft, bevel geared drive and a fancooled radiator, insuring constant circulation when the car is standing still with the engine running.

The Fredonia—The auxiliary or relief port by which the pressure in the cylinder at the end of the explosion stroke is reduced to almost atmospheric pressure, thus prolonging the life of the valves, preventing the decomposition of lubricating oil and attendant low motor efficiency and disagreeable odors.

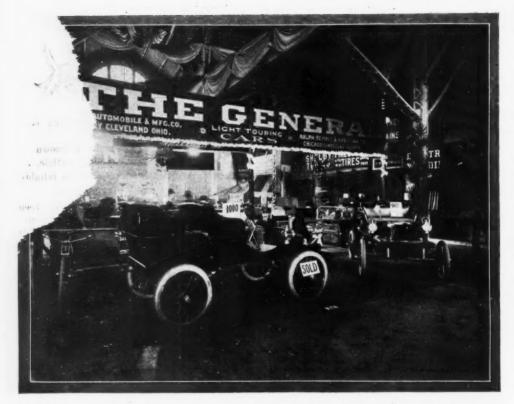
THE COLUMBIA ELECTRIC -The underhung batteries giving the full capacity of the bodies for carrying space, new and graceful designs and general all around superiority.

THE OLDS—The greatest possibilities with the least cost of manufacture, ease of operation, durability and general simplicity at the cheapest original cost. Its original features which have been extensively copied.

The Columbia Gasoline—The accessibility of all parts, inlet valves and spark plugs that can be removed by a quarter turn; the selective type of change speed so arranged that it is impossible to slide through any gear but that



MOTOR AS



MOTOR AGE

THE GENERAL AUTOMOBILE & MFG, CO.'S DISPLAY

desired; graceful lines, strength and durability.

THE SEARCHMONT—The appearance of the car, mechanical perfection of the motor and transmission gears and other vital working parts. It is a car made for American roads and has none of the disadvantages of cars made only for good roads.

The Hoffman—It is the only car in the show selling at the price, \$950, with sliding gears and detachable tonneau. It has roller bearings and the tonneau especially roomy.

THE JONES-CORBIN—That while it is a new car on the market it has an engine of recognized superiority. The 8-horsepower De Dion makes the car the best value for the price,

\$1,000, offered for the 1903 trade. In appearance and power it is superior to many cars selling for 50 per cent more.

The Stevens-Duryea—The fact that it is started from the seat, is vibrationless and noiseless. Its reliability and general usefulness makes it an ideal doctor's carriage.

THE PRESCOTT—Its greater mileage to the gallon of fuel and water than any other steam vehicle. Has reverse lever operated by the foot and the general design is graceful, stylish and symmetrical.

The Union—As a two-passenger vehicle it has the neat appearance of a strong, well built runabout with no suspicion or indication of

being quickly converted into an imposing and comfortable four-passenger car.

THE DARRACQ—The high quality of the material entering into its construction, the great reserve power of the engine, the luxurious upholstering and beautiful appearance,

The Knox—Its air cooled high powered engine, making the car simple to operate, roomy, and doing away with half the parts needed on a water-cooled motor.

The St. Louis—That the motor and transmission are integral, making it impossible to get out of line; shifting pinion and backward device, few parts, ease of operation, and gears running in oil giving long life.

THE DURYEA—One hand control, centrally placed; may be handled by either rider, just as a horse may be driven; triple motor, simple mechanism—a carriage, not a machine.

THE BUFFALO—The greatest power in comparison to weight. It has probably the highest speed of any electric carriage on the market. It is the highest type of carriage propelled by electricity.



Gets the "Dust"



Mr. Whitney

THE PACKARD—The fact that every man that owns a car is satisfied with his vehicle. Our pet phrase is "ask the man who owns one"—our customers sell our cars.

The American—Its low center of gravity, long wheel base and easy riding. Its single-cylinder motor of simple construction, with simple wearing surfaces, is the result of a long period of experiment, making the vehicle simple, reliable and durable.

THE CENTAUR—The ease and absolute control with which the vehicle may be operated; its ability for travel over any condition of roads the operator would care to encounter; its wide range of speed and freedom from objectionable odors incidental to high explosives.

THE WINTON—That it is not an experiment but the result of years of experience and use over all kinds of roads, and in the hands of all sorts of operators. That it has been generally appreciated by those who recognize superiority of design and can differentiate between practical high grade construction and superficial perfection.

THE AUTOCAR—That the car combines the advantages of both a heavy touring car and a light runabout, having interchangeable ton-



: RALPH TEMPLE & AUSTRIAN CO.'S COLLECTIVE EXHIBIT

neau, rear boot and rumble seat. The user can take care of the ear himself, all parts being accessible and every part interchangeable and the price equitable.

THE FANNING—The air-cooled motor with its great radiation, the radiator and fan carrying off more heat more quickly than any other system of air-cooling.

THE CADILLAC—That it is a gasoline runabout with sufficient power and built strongly enough to take the place of many of the so-called touring cars, and sold at a low price. It is manufactured by concern which has engine and automobile experts and has developed every detail to make this car one of the perfect construction, proper arrangement and noise-less.

The Toledo Steam—Its water tube boiler, which is a happy combination of the shell and flash type generators. It has all the advantages of the flash type in its ability to generate steam rapidly, combined with the advantage of the shell type in having great capacity from which to draw.



Mueller of Indianapolis



Sykes

The Haynes-Apperson—First the balanced, opposed cylinder motor; second, the three-speed and reverse control by single lever; third the adjustable wheel steering. These, with the certainty of the make and break spark, gives the carriage its unparalleled reliability.

THE WAVERLEY.—The motor, an improved pattern of the multi-polar type, which has a very high overhead capacity, adapted for hill climbing. Another part is the electric brake, independent of the foot brake, and manipulated through the controller handle, by which the motor is converted into a generator producing sufficient current for retarding the vehicle.

The Shelby—The utilization of reliable methods of construction, the adoption of those essential features which exhaustive experiment have recommended for mechanical completeness, and the suitable adoption of modern methods for modern achievements.

The Woods—Its general fineness of work-manship throughout, everything being made in the Woods factory and nothing but the highest grade of material being used. Every little dail, from the smallest part to the large being under close examination during construction.



MOTOR AGE

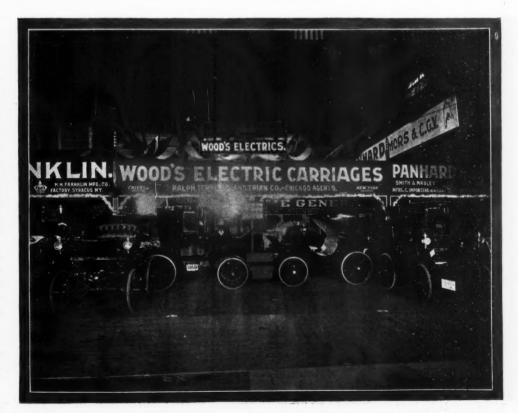
THE LOCOMOBILES

THE RAMBLER—The large engine and conservative horsepower, thermo-syphon system of cooling and the only drum auxiliary brake on the rear wheel on any car selling less than \$2,000 at the show. Also an absolutely sure float feed carbureter.

THE FRANKLIN—That it is particularly adapted for winter use, as no water being used for cooling it can be left standing without fear of freezing and does not have to be kept in a warm storage place. The high and low clutch are on one lever and the spark control is located under the steering wheel, giving the greatest ease of control.

THE LONG DISTANCE—The general arrangement of the mechanism by which all parts are easy of access; the large wearing surfaces on all bearings, the high class workmanship and material and the unusual strength and durability.

The General—That special attention has been given to all parts to insure great strength, thus preventing the possibility of accidents from the failure of any part to work where called upon in an emergency. The General is good for everything a practical runabout should be good for and can be depended upon all the year around.



MOTOR AGE

THE WOODS ELECTRIC CARRIAGES



The novelty of the show is the Jack Frost, an electric machine with an aluminum body which is a cross between a surrey and a tonneau in that the two front seats are of the surrey type, while there is a third rearmost seat of the tonneau pattern. The body is constructed entirely of aluminum and steel and comprises an angle frame on which plates of sheet aluminum are secured by copper rivets and brass bolts. The aluminum is left in the natural or mat finish, hence the name Jack Frost.

To cover all the novel features is to describe the vehicle in detail, as it is in no respect like anything else in the automobile line. The springs are obliquely disposed and extend from the corners of the body to the ends of the axles as nearly as the wheels will permit. The wheels are steel, with tubular spokes, without dish or taper. The pivots of the steering wheels are within the hubs, and as the springs rest close to the wheels the front axle is simply a tube without a truss or central support of any kind. The tires are solid.

The battery is in five trays, which are located transversely in the body and rest on inverted T irons, supported on the angle iron side sills. A single motor of 180 volts is suspended from the body and the drive is by chain to each rear wheel, the differential being on the armature shaft. The novelty even ex-

tends to the seat cushions, which are pneumatic and covered with steel gray corduroy to match the frosty appearance of the aluminum body. All the visible steel work is finished in copper bronze with a satin polish.

The Tincher car, a Chicago production now making its first appearance, has a number of novel features, the one most noticeable being an air brake, pressure for which is provided by a compressor driven by the motor. An automatic controller between the motor and the compressor maintains a constant pressure of 100 pounds. The motor is in front under a hood, and is of the four-cylinder, vertical type, with mechanical inlet valves. A point to which the exhibitors call attention is that owing to the construction of the ignition apparatus and the number of the cylinders, the motor is self-starting for a considerable period of time after stopping. This is accomplished by stopping the motor by cutting off the spark, thus leaving a charge in at least two cylinders. By closing the circuit and causing a spark to occur, sufficient power will be attained to start the motor. While no particular means are employed to reach this end, and it is probable that the same conditions would be found to exist in many four-cylinder



MOTOR AGE

In the Olds Coupe

motors, the manufacturers are entitled to credit for being the first to call attention to this point.

A matter attracting considerable attention is the number and variety of cars fitted with air cooled motors. The well-known Franklin has a four-cylinder vertical motor under an open front bonnet.

OF NEW CARS

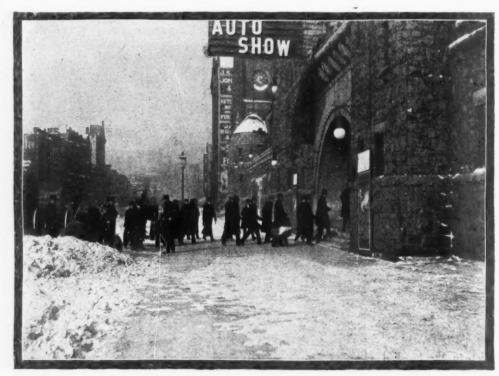
THE COLISEUM

The most radical departure from common construction is found in the Fanning, which has a two-cylinder vertical motor of decidedly odd appearance. The radiators are of sheet aluminum secured in vertical dovetail grooves in the cylinder. The radiators are in pairs, formed by doubling a sheet of aluminum along the vertical center, with the fold secured in the grooves. The projecting sheets are all bent so as to project toward the front of the motor. As apparently no effort has been made toward regularity in forming these radiators, the motor presents an odd appearance. To assure an air draft, a fan resembling the paddle wheel of a stern driven steamboat is located in front of the motor and driven by a train of spur gears at a rate of approximately 1,000 revolutions per minute. This, judging from the size of the fan, should cause a considerable blast. The makers say that the cooling effect is sufficient even when running the motor with the carriage standing still.

Another air cooler making its debut is the Mitchell Junior, an extremely light and catchy little runabout, with a single cylinder motor slanting forward under a hood formed of a fine mesh wire screen. The feature of this motor is that instead of the flanges being cast on

the cylinder they are stamped from sheet copper and pressed on the cylinder, which is simply a cast iron cylinder finished inside and out. Between the flanges and serving to maintain them in place are rings about 4 of an inch in width, cut from thin copper tubing of proper size to afford a tight fit on the cylinder.

The bore is 3½ inches, with a 4-inch stroke. The motor is rated at 4-horse power. The manufacturers state that one of these motors was run on a bench, indoor, for 7 hours without overheating. This motor is also applied to a motor cycle, to which the



MOTOR ACE

DEALERS ATTENDING A MORNING SESSION

makers have given the cognomen Mile-a-Minute.

The Orient buckboard is a new car to the west. As its name implies, it is distinctly a buckboard, with long wheel base and narrow tread, with a single vertical cylinder air cooled motor, grooved directly to the differential on the rear axle. This machine is the extreme of simplicity, without change speed or reverse drive. The fan and air funnel on it when shown at New York are missing.

The Jaxon runabout has a Brennan double opposed cylinder motor transversely placed over the front axle. In other respects it is of usual runabout construction.

The "waterless" Knox, with its porcupine motor, is too well known to require description.

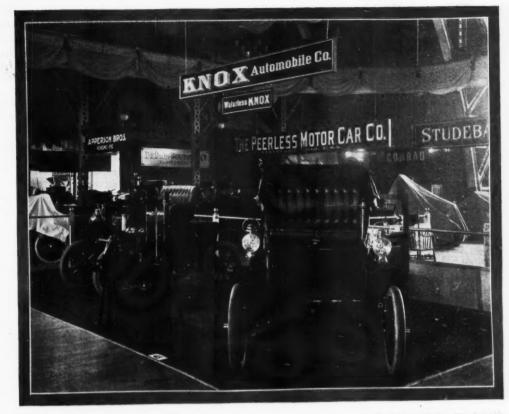
NO ATTEMPT AT RADIATION

The Caloric motor carriage is really in a class by itself, as no effort is made to cool the motor in any manner. On the contrary, it is partially encased in asbestos to retain the heat. The motor is the development of the one exhibited at the Chicago show of a year ago, and is a compound hot air and gas engine, with two pistons in each cylinder, which are so connected with the crank shaft that in each cylinder the phases of a four cycle motor occur during each complete revolution of the cranks, or, in the phraseology of the exhibitors, it is a two cycle motor with a four cycle action.

The feature on which particular stress is laid and that appeals to the experienced tourist is that either gasoline, kerosene or a mixture of both may be used, and that as no carbureter is required, any grade of gasoline is as good as the best.

NO RADIUS RODS

Another machine in the maiden class is the Auburn, a runabout with tonneau attachment. The car is built on conservative lines, with no radical features except that the back springs, which are three-quarter ellipse, are so formed that their forward ends are practically in line from the rear axle to the motor shaft. They are slidably connected with the body frame and provided with screen adjustment



MOTOR AGE

THE "WATERLESS" KNOX

at the end so that the axle may be moved in relation to the motor. Radius rods are unnecessary, and a number of working joints are obviated.

MECHANICAL INLET VALVES

Of the number of handsome motors exhibited none attracted more attention than the National. Two motors, two and four cylinders, respectively, and identical except in the number of cylinders, are shown. The features are ample water jackets, mechanically operated inlet valves, and a throttle governor on the secondary shaft, which shaft operates both inlet and exhaust valves and the ignition commutator.

The governor is of the centrifugal ball type,

and operates a throttle between the carbureter and the motor. The fly wheel is machined to fit a male clutch on the transmission shaft. The carbureter is of the float feed type and attached directly to the motor.

ONE HAND SPEED CONTROL

The Marr car has a number of new devices, the most notable being the controlling lever, which is arranged to be moved from the normal point to four positions, which respectively affect the two forward speeds, the reverse and brake.

The steering wheel may be moved to or from the seat, and is held in place by a latch in the footboard.

All oiling is controlled from outside the body, the regulators being located immediately below the seat line on the driver's side of the vehicle.

FULL OF TRICKS

The Muncie convertible runabout, which may be made into a four-seater, is chock full of conveniences. Chief among these is a combination of the steering wheel with the motor so that the former may be used for starting the latter from the seat. The steering wheel post is hinged. When in a vertical position it connects with the motor so that by turning the hand wheel the motor is started. When it is pulled backward to the normal steering position the connection is switched to the steering gear. In connection with this feature is a little device whereby when the steering post is raised to the vertical position the spark shifter is thrown to cause a late spark, thus preventing an accidental early spark and back firing when starting the motor.

Among the new radiators at the Chicago show that on the Columbia gasoline car comes in for more than usual attention. It is of the cellular type and is made by the Whitlock Coil Pipe Co., of Hartford, Conn. The radiator was first shown at the New York exhibition and immediately jumped in favor. It has since been subjected to the most severe test on the Columbia car and found efficient in every respect.



MOTOR AGE

EXHIBIT OF THE FREDONIA MFG. CO.

FRENCH TO BOOST AMERICAN TRADE

These Makers Are Coming to the St. Louis World's Fair Prepared to Create a Great Impression of French Industry

The French cycle and automobile board of trade at its last meeting voted an appropriation of \$2,000 for the assisting of the French manufacturers to exhibit at the St. Louis World's fair. Mr. Darracq, who was elected president of the board of trade at the same meeting, in the course of a lengthy discourse, pointed out the ultimate benefit for the French industry in being well represented at the American Exposition. It may be said that his speech, more than any other argument, decided the members present to vote by the subsidy.

There are several French automobile manufacturers who do not care to exhibit abroad, especially in the United States—in the latter country chiefly on account of the high duty—and also because they can hardly supply the home demand. On the other hand other large French makers, among whom is Mr. Darracq, think that there ought to be something more than a little selfishness displayed and that the makers ought not to forget that if they do not profit themselves by exhibiting, they render a great service to their fellow manufacturers.

AFTER INTERNATIONAL GREATNESS

One of the best known makers is quoted as having said: "We have enough orders to keep us busy for the next 12 months. We could work day and night. Yet I decided to exhibit at all of the important coming automobile expositions. In one way it is almost money thrown away, and a lot at that, as it is expensive to participate in a large way at an automobile show. But I do not begrudge it. Of course I cannot think of accepting orders, unless my prospective customers are willing to wait for delivery a long time and very few will be willing; but the idea is not to get orders but to keep the French cars in the minds of the people, to show them that we are there, that we lead the world, that we are overcrowded because we make the best.

"In the international commerce of the world the Germans occupy one of the three first positions. Why? Because they exhibit in almost every small or large international fair. Exhibiting and advertising done in a conscientious way always brings results and the Germans more than any other people know it."

GROWING BELGIAN INDUSTRY

Figures relative to the automobile industry in Belgium during the past year are not just of the kind the neighbors of the little kingdom can enjoy the best. It is said frequently that the French are really becoming somewhat alarmed at the rapid growth of "their" great industry in Belgium.

In 1901 eighty-five vehicles valued at \$80,547 were imported from various countries, sixty-five coming from France and six from Germany. Last year the imports reached 127 machines, worth \$91,542. Again France sent the most—104. Germany furnished only eight.

The export table is more interesting. In 1901 Belgium sold 216 vehicles, representing \$171,543, and last year 206, valued at \$242,318. Both years England was the heaviest purchaser, taking fifty-five vehicles in 1901

and 118 last year. The trade in parts is advancing rapidly. During 1901 the imports amounted to \$73,018, of which amount the United States may claim but \$2,777. During the past season the imports only reached \$71,318, in which the United States figures for only \$100. The export of parts reached \$27,466 in 1901 and \$50,678 last year. France was the best customer each year, buying \$8,167 worth in 1901 and \$21,754 worth during the season just ended. England is the next on the list.

While these figures are not large they are striking on account of the small population of the country and the small number of automobile vehicle and parts makers. The growth of the exports and the gradual decline of the imports is a striking demonstration of future possibilities.

PARIS-MADRID COURSE SELECTED

Official Timekeeper of Automobile Club of France Traverses Road and Pronounces It Suitable

Paris, France, Feb. 2—M. Tampier, the official timekeeper of the Automobile Club of France, has returned to Paris from a long and arduous trip made in the endeavor to secure a suitable route for the Paris-Madrid road race. The road selected by M. Tampier and over all of which he traveled, will, it is expected, be in first-class condition early in the spring, although now, on account of the extremely bad weather, some stretches of the course are wretched.

From Paris to Couhe-Vera the road is well known to the automobilists of Europe. From the latter point to Ruffec the roadway has been greatly improved within the last few months, having been widened by the government and made into a first-class road. The stretch leading out of Ruffec is also in good condition, but the road between Angouleme and Narbeziex is not very good, there being many holes to be avoided, and the roadway being covered with stones. It would not be a very hard task to remove these obstacles, but the run over this stretch is only a short one. From Barbezieux to Chenonceaux good conditions exist and from Chenonceaux to Montguyon, a short distance, the road has been lately reconstructed, so by the time the race will come off it will be hard and dry. The same may be said of the road from Montguyon to Libourne.

As was already known, the commission charged with the selection of the road has decided for the Bordeaux-Bayonne course. If, as expected, a short stop of one day will be made at Bordeaux, the garage will be situated at the Quinconces. The next start will be effected at Pessac, a little hamlet 3 miles from Bordeaux and then the chaffeurs will pass by Beliet, Belin, Labouheyre, Castegts, Magescq, Saint-Geours de Marennes, Saint Vincent de Tyrosse, Bayonne, Saint Jean de Luz. Behobie, which last place is the border station where the examination by the Spanish customs officials will be made. The most remarkable fact in this race is that on this part of the road, all the record-breaking will be attempted, as from Magescq to Saint Geour de Marennes, about 7 miles of splendid road will be found, which has a slight grade. M. Tampier says all the people in the country as well as in the towns are desirous that the race will occur. and it is hoped that it will soon receive the sanction of the government. Practice runs over the course will commence shortly.

HAS SWELL RETAIL HEADQUARTERS

Winton Company Opens Its Immense Garage at Cleveland—Other Ohio Companies in Modern Establishments

Cleveland, O., Feb. 16—The Winton Motor Carriage Co.'s new sales and storage building on Huron street was opened for business last week and several samples of the well-known Winton are now on exhibition.

This is one of the best buildings for its purpose in this part of the country. It is 35 by 137 feet in area and is four stories in height. The basement has a cement floor and is equipped with a large wash rack, the washing and cleaning of machines being one of the special features. It is possible that a private bowling alley may occupy a portion of the space. The salesroom and office is 35 by 50 feet and is handsomely finished in hard wood, with desks and fixtures to match. The rear portion of the store will be used for storage.

The second floor has a front room nicely finished for headquarters for a proposed "Winton Club." It is about the same size as the salesroom on the first floor. The rear portion of this floor will be used for storage or for an exercise room. The third story will be used exclusively for storage purposes. The fourth floor contains a complete repair shop, with pits and all other conveniences for doing firstclass work. The building is equipped with toilet rooms, bath room and all other accessories to make it complete in every way. Charles B. Shanks will be sales manager and also advertising manager, while Roy S. Drake, an old Cleveland newspaper man, will be his assistant in both capacities.

TRADE IS RUSHING

The Cleveland Automobile & Supply Co. will occupy its new building about the first of the month, if the workmen can possibly finish their task in that time. It is needed so badly that the company will go in before it is completed, rather than remain in the present cramped quarters longer. There will be a complete repair shop, charging station and everything else that goes to make up a first-class garage.

The General Automobile & Mfg Co. has begun working nights to keep up with the orders. The normal output is almost sold now, but the company will push matters a little and get out all the machines possible.

The Ohio Motor Car Co. is making some changes and improvements in its rooms in the Pythian Temple, which will give it a convenient and commodious store in every way. While this company is young, its members are making a hustling effort for business that is bound to win trade. The National, International and other machines handled are being well received by the people here and a largely increased inquiry for machines since the show is reported.

L. D. Schoenberg, president of the May Co., a retail dry goods concern, has purchased a \$5,200 Locomobile, with king of Belgium body and canopy top.

HARD ON BROOKLYN MOTORISTS

Automobilists, pharmacists, proprietors of saloons and paint stores are aroused against a new set of regulations regarding the sale and storage of benzine, gasoline and naphtha in Brooklyn, N. Y. These new regulations provide that no benzine, gasoline or naphtha

shall be stored or sold in drug stores; that paint stores located in buildings containing not more than two families, may sell it only for solvent purposes; that gasoline for automobiles must be stored in tanks buried at least three feet under ground, protected by vent pipes extending above the tops of adjoining buildings; and that such combustibles must be otherwise isolated and regulated so as to provent fire or accidents.

AUTOMOBILES OR STREET CARS?

The substitution of automobiles for the Union Traction Co.'s street cars on Chicago's north side is the threat which the Improvement Club of two important wards holds over the head of President John M. Roach unless he returns an immediate and satisfactory reply to the citizens' demand for improved transportation service. This drastic step was suggested in a set of resolutions introduced at the regular meeting of the club this week. Two weeks was the time allotted Mr. Roach in which to submit his reply to the club's demands for grooved rails, new cars and other improvements.

WORK FOR LARGE MEMBERSHIP

Cleveland, O., Feb. 14—The annual meeting of the Cleveland Automobile Club took place at the Hollenden hotel Tuesday evening, when the following officers were chosen: President, E. Schryver Reese; vice-president, Fred T. Sholes; secretary, George Collister; treasurer, Windsor T. White.

The club at present has almost 100 members, but the officers state that they have an executive committee that will make a special effort to secure new members and they believe before the end of another year they will have at

least 500 members. There are about that many machines in operation in the city at the present time and from all indications the number will be doubled this season. It would seem that there is, therefore, no figurative language in the claims for the future.

It is also probable that headquarters will be secured some place for the club. The dues are as yet low, and it will not be practical to do otherwise than lease quarters at the present time, but the officers say they hope some time to own a permanent club house.

DEMONSTRATING SESSIONS

Both the New York Motor Cycle Club and the Alpha Motor Cycle Club, of Brooklyn, are arranging for "demonstrating" meetings. Makers of motor bicycles have agreed to have representatives present to dissect and demonstrate their respective machines.

AUTOMOBILE DAY AT FAIR

T. D. Wilkin, Fred H. Elliott and C. Arthur Benjamin of the Syracuse Automobile Club, of Syracuse, N. Y., held a conference last week with State Fair Commissioner A. E. Perren on the matter of the projected automobile day. Mr. Perren said that the commission had voted to allow \$1,500 for automobile races on Saturday of fair week.

Six prizes of \$250 each will be offered and it is hoped that the races will bring to Syracuse Fournier, W. K. Vanderbilt, Jr., H. S. Harkness, Alexander Winton and others of note.

TO BE SOLD FROM CHICAGO

The Kokomo Brass Works, of Kokomo, Ind., announces that hereafter the carbureter department will be conducted under the name of Byrne, Kingston & Co., of Chicago, and that the inventor of the carbureter, George Kingston, will have charge of the sales department. Several of the leading automobile manufacturers have adopted the Kingston carbureter as a part of their regular equipments. In addition to the new 1903 pattern the company will continue to carry the 1902 model.

TRADE BREVITIES

The Roe Automobile Co., of Buffalo, has been incorporated with a capital stock of \$10,000.

Among the varieties in lamps at the Chicago show is a headlight and generator designed especially for Oldsmobiles, and shown by Λ . H. Funke.

R. T. Yeats, who has for many years served in the office of a railway freight agent, has joined the Olds Motor Works forces as manager of the traffic department.

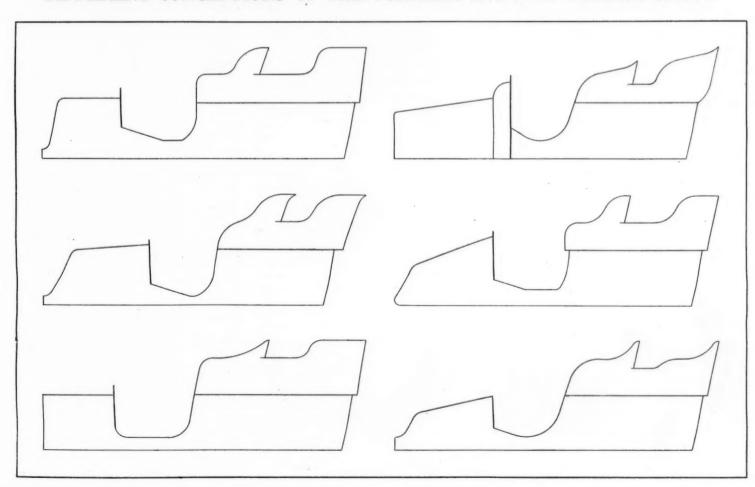
The little Jones-Corbin car with its 8-horsepower De Dion motor is attracting considerable attention at the Chicago show. A. C. Banker took the agency for Chicago.

The Mead Cycle Co., of Chicago, expects to enter the retail automobile trade vigorously. It now sells the Murray, Hoffman and Benz and expects to secure other agencies.

With the thermometer below zero the waterless Knox demonstrating car was standing in front of the Coliseum during the Chicago Automobile show and was always ready for use.

There was no more enthusiastic man at the Chicago Coliseum over the show's business results than C. F. Splitdorf, of New York. "I am writing orders for coils, batteries and sparking plugs so fast," said he, "that I have to fill my fountain pen every hour."

DIFFERENT CONCEPTIONS OF THE TONNEAU BODY AT CHICAGO SHOW



MOTOR AGE

Published Every Thursday by SAMUEL A. MILES
AT 324 DEARBORN STREET, CHICAGO.
Telephone Harrison 3584

Eastern Office, 150 Nassau Street, New York.

Entered at the Chicago Post Office as second-class mail matter.



Member Chicago Trade Press Association

SUBSCRIPTION:

ONE YEAR, TWO DOLLARS. SIX MONTHS, ONE DOLLAR.

Any newsdealer may obtain MOTOR AGE through the Western News Co., Chicago, or any of its branches.

THE WESTERN FIELD



A glance over the comparative tables in this issue showing the preferences in constructional systems as exemplified by the Chicago and the New York shows, brings out the interesting fact that the western representation at Chicago, which makes up for the loss of several eastern and European makes, yields a composite structure based on majorities, in which the single-cylinder, horizontal motor back car displaces the two-cylinder, vertical motor front car, compositely produced by the majorities at the eastern show

Granting that the preferences in manufacture of the western field are more or less in line with the commercial preferences of the same field, the natural deduction is that in the west has grown up a great demand for cars of more general usefulness than the high-powered touring cars which attract the automobilist of pleasure. Out in the west are great masses of professional men, merchants, farmers and delegates at large of the so-called great middle class, who wish reliable, moderate price cars of all-around utility, which shall have touring endurance and ability for hard work at fair speed, but with simple construction, easy control and cheap maintenance. The Chicago show is a Mecca for such buyers.

CHICAGO A TRADE CENTER

Whenever an automobile show comes to Chicago the trade comes with it, and naturally compares the western metropolis with the eastern metropolis, as well as the western show with the eastern show. There are certain phases of Chicago which lack attraction when subjected to comparison, but this year none can refute the importance of Chicago as an automobile trade center.

Of course, a certain element may jokingly remark upon the aptitude of westerns to dabble experimentally in more or less odd systems of automobile construction, and may point to the scarcity of really important manufacturers of automobiles in and about Chicago. But the whole usefulness of towns is not to build automobiles. The machines must be sold, and to sell them users must be secured. Here Chicago commences to shine.

There is probably no city in the country which is better situated or better suited to serve as a great distributing point. Foresight on the part of some of the eastern manufacturers led to the establishment of Chicago branches and agencies, which were not merely local repositories, but headquarters for the retail business of the entire middle west. These are growing in numbers and will grow in numbers until Chicago becomes the greatest retail automobile center of the country.

New York is limited to a more closely allied territory, for the dealers and individual purchasers north, west and south have other distributing points with n easy reach or are closely in touch with the manufacturers of the eastern division. Chicago stands in the center of a wide field of users, who are not close to any other great center or to manufacturers. They buy goods of all sorts in Chicago—their natural trading center. That they should look to Chicago as the center of their part of the automobile trade is only a phase of rational commercial procedure.

The very fact that on the second day of the Chicago show over 400 tradesmen and individual customers had registered at the Coliseum to secure the reduced railway fare, whereas less than a hundred had registered at the same time last year, shows that Chicago has just come into its own—that with the general scurry toward automobilism in the west those who have entered the field have chosen Chicago as their rightful headquarters for everything relative to automobiles.

FUTURE SHOWS

What of tomorrow? What shows are to be given the hearty and entire support of the trade? The New York and Chicago shows have demonstrated their value and their greatness. Never was such a spectacle of automobiles presented in this country as stretches out before the eye in the Chicago Coliseum. The vividness of the picture is of itself a most striking testimonial to the character and size of the automobile trade.

These shows are great features of the automobile industry, which, with the steady growth of the trade, will perhaps, even by next year, develop to the magnitude of the Paris show of December. At least nothing but the size of exhibition buildings in this country prevents such a growth. There is another show of the future, however, to which little attention has been given. This is the world's fair at St. Louis in 1904. It has not drawn an enthusiastic display of interest from the automobile



trade. Just now the manufacturers' association is endeavoring to create the lacking interest in it. And why? Simply, if for no other reason, because this show is a comparison of nations. France has already started a movement to give a representation of the French automobile trade which shall be one great advertisement of the forwardness of France in this industry. Many of the French makers, while believing that there is no immediate profit for them individually in exhibiting at St. Louis, on account of the sale of their product months ahead of the production and the consequent inability to take more orders than those coming through natural channels, have still insisted that the whole French trade be represented strongly. They wish to see France lead the world, and wish to accentuate this leadership at the 1904 exposition.

The situation in which the American trade thus finds itself is nothing more or less than the task of keeping France from beating us at our own game. We must make a showing which will permanently fix the importance of the United States in the international automobile market and which will also prevent the growth of an impression that we are behind Europe in the production of commercially practical automobiles for the uses of this country. It is up to us to keep out of defensive ground by taking the offensive and rendering it necessary for other countries to shoulder the hardship of keeping to our pace, instead of enjoying the pleasure of setting it at our expense.

THE N. A. A. M. ELECTION



Cleveland wanted the presidency of the National Association of Automobile Manufacturers this year, and was sorely disappointed by the unexpected election of an eastern man, M. J. Budlong, of Hartford. Without disputing the right of Cleveland to consider itself sufficiently important in the trade to deserve the presidency, it is still evident that Cleveland has lost less than it imagines.

The greatest good which Cleveland can secure from the N. A. A. M. is its share of the benefits derived from the work of the N. A. A. M. There is every reason to believe that the present incumbent of the chief executive office is capable of managing the affairs of the association in an equitable and progressive manner. The association has a good president. Cleveland should be glad of this with the rest of the trade

The association is young and there are further chances for Cleveland to seek the honors of office-holding. In the meantime, there is work to be done—work which necessitates the hearty co-operation of the whole trade. Cleveland can best serve itself by assisting in this work. The importance of Cleveland grows with the growth in importance of the industry generally



THE BRITISH AUTOMOBILE EXHIBITION AT CRYSTAL PALACE, LONDON

London, England, Jan. 31—England's great show of this season—the Crystal Palace exhibition—opened yesterday in full glory and with an exceptional attendance. One hundred and forty exhibitors occupied 84,000 square feet of floor space and with this great spread of exhibition area presented an altogether striking display. The exhibitors were divided as follows: Sixty showed gasoline cars; twelve, steam cars; four, electric cars; forty, sundries, parts, accessories, etc.; twelve, tires, and twelve, motor bicycles.

SUMMARY OF DISPLAYS

While the total number of cars exhibited reached about 500, on account of the great number of patterns and duplicates shown by the respective exhibitors, and on account, also, of the several duplicate exhibits of the same makes of cars of French origin by different English representatives, the total number of different makes of cars represented was 101, according to the count made by the Motor Age correspondent the first day. It is probable that a few more will be brought in later. Of this 101 makes of cars, seventy-one are gasoline, eleven steam, four electric, twelve motor bicycles and three large vans. There are three makes of American gasoline cars shown-the Oldsmobile, Winton and Duryea; five makes of American steamers-the Locomobile, Stanley, Toledo, Grout and White, and one American electric-the Baker.

The Crystal Palace show is undoubtedly the representative English show. At both of the bicycle and motor cycle shows held early in the winter there was a fair representation of English automobiles, but the exhibits in no way told of the extent of the automobile trade in this country. The recent Stanley show at Earl's Court was more generally representative of the entire trade, but even here, by the absence of numerous large companies, the fact that the trade had held off for the Crystal Palace show was evident. The present show is the officially sanctioned and patronized show of the Society of Motor Manufacturers and Traders.

LARGEST IN ENGLAND

In every respect is the show larger than any held previously in this country, for substantially all of the desirable exhibition space in the great glass palace is occupied, and the experienced show visitors who glance around the display prophesy that should next season's show be as much an improvement over this one as this is over the show held last February the building will be crowded to its limit, even if not found inadequate, should all the exhibitors demand as large individual spaces as they now occupy.



The representation of the American and French cars and of brand new English cars which are here making their first bid for popularity is remarkable.

While most of the French cars shown are duplicates of or the same cars that were exhibited at the Paris show of December, there are a few French cars, the 1903 models of which had not been completed in time for exhibition at the Grand Palais.

In the matter of sales it cannot be determined at the time of writing whether or not the show will be a big commercial success, but, judging by the attendance of the first day and the air of enthusiasm around the Palace, it may be expected to be the greatest show of the year in this respect as well as in the point of number and of representativeness of the exhibitors.

VEHICLE EXHIBITS

DAIMLER MOTOR Co.—Light road and a 22-horsepower, four-cylinder English Daimler car. Among the important changes are the elimination of the under frame, the adoption of a friction driven pump, increased

wheel base and spring length, adoption of pedal brake and elimination of connection between hand brake and clutch to withdraw the latter when the former is applied.

DE DIETRICH & Co.—Ten and 12-horsepower two-cylinder and 16 and 24-horsepower fourcylinder De Dietrich cars.

DE DION-BOUTON & Co.—The new 6-horsepower voiturette with the motor in front; new 8-horsepower pattern having three speeds and reverse gear; new 10-horsepower model with double cylinder motor and sliding gear transmission having four forward speeds; several forms of chassis which are to be sold to makers wishing to assemble their own cars.

H. P. Deasy—The 16 and 20-horsepower Rochet-Schneider cars of the same style as those shown at Paris.

ELSWICK MOTORS, LTD.—Several patterns of the new Elswick in which mechanically controlled inlet valves, bevel gear drive and extreme accessibility of the mechanism are prominent features.

Brush Electric Equipment Co., Ltd.—The 10, 12 and 16-horsepower two-cylinder and the 20-horsepower four-cylinder Brush cars, in which mechanical inlet valves, honey-combradiator, force feed lubrication and covered bodies are features.

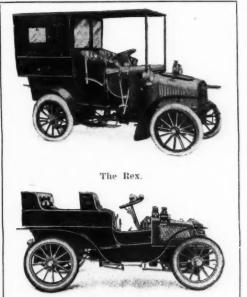
E. J. Coles & Co.—Six to 22-horsepower Bell carriages, one of which has the Ellis steering gear and control system that enables the engine to be started from the driver's seat.

S. F. Edge.—New patterns of the Napier car, among whose special features are adjustable ball bearing end thrust for the main bevel gear of the transmission set, admission throttle actuated by both hand and foot, accessibility of transmission gear parts, new circulating pump and radiator with forced draft. Six, 10, 12 and 16-horsepower Gladiator cars whose new features are mechanical governor, honey-comb radiator, forced air draft, square motor bonnet, mechanically operated inlet valves, lengthened wheel base and wipe spark ignition.

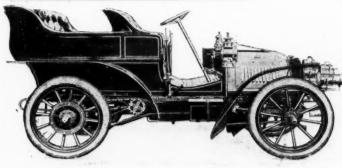
EAGLE ENGINEERING Co.—The 8-horsepower Eagle sociable and tandem and a new light car of radical lines, whose transmission is similar to that of the sociable.

DENNIS BROS., LTD.—Nine, 12 and 20-horsepower Dennis carriages whose special features are spring drive, new, all metal brake, well protected universal joints and Mercedes radiator.

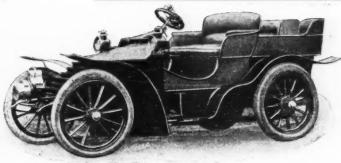
CENTURY ENGINEERING Co.—The 12-horsepower Century with automatic electric light to enable gear changing at night; new 6½horsepower two seated voiturette with Aster



The Humber

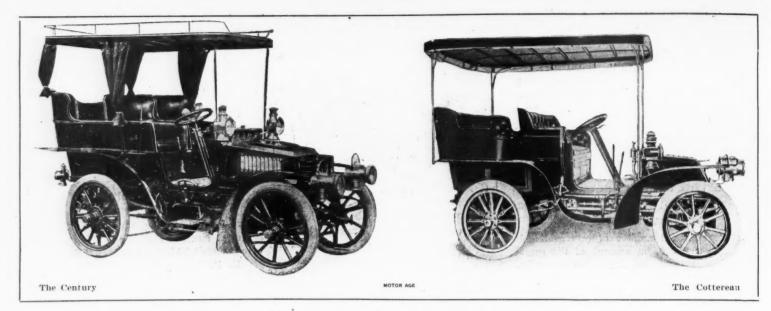






MOTOR AGE

The Wolseley



motor, three speeds and reverse and inlet governed.

ENGLISH MOTOR Co.—The light Rigal car and the Oilmobile.

Mann & Overton—The Mercedes, Daimler, Georges-Richard and Peugeot cars.

LONDON MOTOR GARAGE Co.—The 15 and 20horsepower Pipe car; 12, 16 and 24-horsepower Magnet cars, and several patterns of the Lancaster, which has attained prominence on account of its air-cooled motor.

CLINGOE AUTOMOBILE SYNDICATE—Panhard, Clement, De Dion, Darracq and Pieper cars.

ALBION MOTOR Co.—New type of Albion carriage with motor in front, among whose special features are a governor controlling the motor at all speeds, new magneto ignition and encased driving chains.

J. W. Brooke & Co., Ltd.—Twelve-horse power, three-cylinder Brooke car with a chain variable speed gear and mechanically operated inlet valves.

ALLDAYS & ONIONS PNEUMATIC ENGINEERING Co.—Traveler light cars in two and three seat patterns; also a car said to have been driven over 13,000 miles without repairs or replacement of parts.

Botwood & Egerton—Primus 5-horsepower, moderate price two seaters; several middle-weight cars and a 14-horsepower pattern in which the special features are in the cooling and braking systems. Gobron-Brillie cars in 8 to 30-horsepower models, including duplicate of the car which Rigolly drove in important European events last season.

James & Brown—Nine and 18-horsepower James & Brown cars, the large one being a new four-cylinder model with valves accessible by loosening two nuts, and with cylinder heads and water jackets cast in one piece, sparking plugs and commutator easily accessible and hand or governor controlled throttle,

BEAUFORT MOTOR Co.—Several patterns of the well-known Beaufort cars with new features in the brakes, frame and bearings.

FARMAN AUTOMOBILE • Co.—Panhard cars with the new Panhard Centaur motor; 12 and 24-horsepower F. A. C. cars on Panhard lines; 9 and 11-horsepower Argyll cars, and a 10-horsepower Clement.

ANGLO-AMERICAN MOTOR CAR CO.—The Oldsmobile and the Winton.

FARMAN BROS.—Victrix cars, the 6-horsepower pattern of which has a De Dion motor, three speeds and reverse, direct drive on high speed, bevel gear transmission, double acting foot and hand brakes, artillery wheels and two seat body. In the larger patterns multiple cylinder engines of the Centaur type are used.

ARIEL MOTOR Co., Ltd.—Two-cylinder 10-horsepower and four-cylinder 16-horsepower models, in which reliability, noiseless operation, economy of construction and simplicity are the talking points.

HUMBER, LTD.—Twelve and 20-horsepower Humber models, the latter of which is a new pattern with extremely long wheel base, inedium speed engine, mechanically operated inlet valves, throttle governor, commutator on dash, tubular frame, Mercedes radiator, transverse front spring with distance rods from the axle to frame.

Auto Carriage Co.—Bardon cars in which special features are balanced four-cylinder motor, mechanically operated valves, governor which permits any speed between 200 and 1,100 revolutions and magneto ignition.

DURYEA Co.—Several patterns of the English made Duryea cars, which are substantially

the same in construction as the American Duryeas,

C. Gautier & Co.—Six, 12, 16 and 20-horsepower Gautiers in which all parts are interchangeable for each pattern.

HOZIER ENGINEERING Co.—Argyll cars in patterns with Clement and De Dion motors, and among whose new features are friction clutch without end thrust, new change speed gears with larger clutches having interlocking grooves on both sides and arranged to prevent damage to the gears by careless handling, and a detachable gear box.

Graphic Motor & Engineering Co.—Deschampes cars in 9-horsepower two-cylinder and 14 and 18-horsepower four-cylinder patterns with Panhard style of transmission.

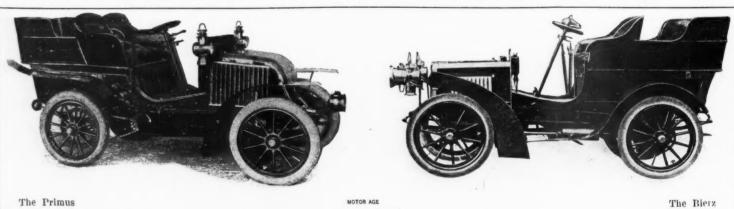
HEWETSON, LTD.—The 6, 10 and 12-horsepower Benz cars with vertical motors, gear driven magneto, single lever speed gear, direct drive on high speed, and metal to metal clutch break. Belt driven cars are also shown. These will not be discontinued.

H. E. Hall & Co.—Darracq cars, including two of the specially finished chassis exhibited at the Paris show. Oldsmobiles, Panhards, Populaires and Kitto light cars are also shown. The Kitto is a specially made car built in America.

E. W. Hart-Mercedes, Panhard, DeDietrich, Darracq, Renault and Gladiator cars.

HAYNES & SONS, LTD.—Wartburg cars in 51-5 and 8-horsepower sizes and a 5-horsepower delivery wagon, all with two-cylinder motors.

Wolseley cars from 5 to 30-horsepower, and 45 and 50-horsepower racing models. The latter are light and have pressed steel frames and horizontal motors.



STAR ENGINEERING Co.—Two patterns of Star light cars.

J. Marston, Ltd.—New 12-horsepower, four-cylinder Sunbeam car in which a special feature is the complete protection of the motor parts.

WILSON & PILCHER—Ten-horsepower Wilson & Pilcher car with four-cylinder horizontal motor mechanical valves and single trembler for the four cylinders.

SIDDELEY AUTOCAR CO.—New Siddleley cars with Mercedes pattern of radiator, mechanical inlet valves interchangeable with exhaust valves,

direct drive from the engine to differential on high speed, pressed steel frame.

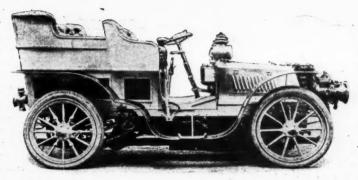
Weston Motor Syndicate.—Chenard-Walcker cars in two patterns, one with gear and the other with chain final drive.

MARSHILL & Co.—Belsize bevel gear driven cars in several styles.

FRANK F. WELLINGTON—Also exhibits Brooke

J. L. Sardy.—The new Hermes car in two and four-cylinder patterns in which the transmission gears are always in mesh and with detachable bodies.

THORNYCROFT STEAM WAGON Co.-Ten and



The Brush

and four-cylinder vertical motor patterns of convention design.

SWIFT MOTOR Co.—Exceptionally light 44-horsepower, two seated cars with the constructional features which generally characterize larger vehicles.

ROADWAY AUTOCAR Co.—All patterns of Mors and Renault cars.

РІСК Motor Co.—Patterns with gear and with belt drive.

NEW AUTOMOBILE Co.—Various patterns of the Rochet car.

PROGRESS CYCLE Co.—Progress cars in three models with Aster and De Dion engines, in

in which the most noticeable feature is a feed water regulator, controlling the water level in the boiler and having an alarm which acts when the engine pump fails.

NEW AUTOMOBILE Co.—Six and 10-horsepower Miesse cars.

VICTORIA CARRIAGE WORKS.—The Toledo steam carriage.

CLARKSON & CAPEL STEAM CAR SYNDICATE.—The new Chelmsford steam cars, including one said to have been driven 3,000 miles at an expense for fuel of \$9.50.

J. L. SARDY—Saracen car of new design especially intended for English road use, being of heavy construction throughout.

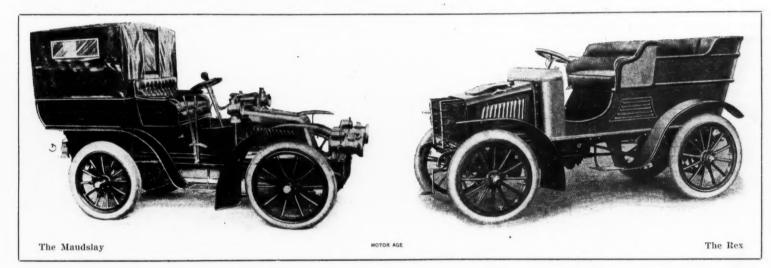
SPEEDWELL MOTOR CO.—Full line of Serpollet cars, including a duplicate of the famous Easter Egg.

ELECTRIC CARRIAGES

ANGLO-AMERICAN MOTOR Co., LTD.—Line of the Baker electric carriages,

CITY & SUBURBAN ELECTRIC CARRIAGE CO.— Large line of stylish carriages for conventional uses.

ELECTROMOBILE Co.—Small electric cars with radius of from 45 to 50 miles.



20-horsepower patterns of the new Thorny-croft gasoline cars.

VELOX MOTOR Co.—Several patterns of the well known Velox cars, showing little change from previously exhibited models.

MAUDSLAY MOTOR Co.—The 20-horsepower car is one of the two representatives of three-cylinder construction. It has mechanical inlet and exhaust valves, both operated by a single shaft across the motor head, new fan cooled radiator and force feed lubrication throughout.

McNeil, Hutchinson & Borthwick—All of the many sizes of the Cottereau cars same as those shown at the Paris exhibition.

C. S. Rolls & Co.—Full display of Panhard cars

MILNES-DAIMLER — Milnes-Daimler landaulette and a new Mercedes-Simplex.

REX MOTOR MFG. Co.—Three sizes of the well known Rex cars, the 10 horsepower, single cylinder model of which is fitted with a governor that is said to produce an exceptionally silent motor.

PANHARD & LEVASSOR—The entire display made at the Paris show.

Motor Car Co.—Decauville cars as exhibited of Paris

Motor Mfg. Co.-M. M. C. cars in one, two

which direct bevel gear drive in the high speed and exceptionally strong transmission gears are features.

THE STEAM CARS

WHITE SEWING MACHINE CO.—Full line of regular White steamers and the new Tonneau model.

LOCOMOBILE Co. OF GREAT BRITAIN—Full line of Locomobile steam cars.

WESTON MOTOR SYNDICATE—Weston steam cars, which are the British members of the Grout family.

GARDNER-SERPOLLET—Full line of English and French made Serpollet flash boiler cars.

Cockshoot & Co.—The Stanley steam cars of the latest patterns.

Motor Construction Co.—Vapomobile cars



The Thornycroft, Milnes-Daimler and Straker heavy delivery wagons are shown in the stands of their respective makers.

The motor bicycle exhibits include the following machinery: Alldays, Werner, Phoenix, Westfield, Rex, Bat, Peerless & Bradbury, Kerry, Benz, F. N., Ixion and Quadrant.

CATALOGUES RECEIVED

The Wagner Cycle Co., of St. Paul, Minn., in a neat small booklet shows the latest styles of the Wagner motor cycle and presents some of the strong points in its favor.

The Chas. A. Stickney Co., of St. Paul, Minn, presents in interesting form the opinions which their customers hold in regard to the Stickney Junior gasoline engine.

The catalogue of the Bartholomew Co., of Peoria, Ill., shows in attractive form the several novel features of the Glide Mobile.

The Chelsea Mfg. Co., of Chelsea, Mich., is accentuating the mechanical advantages of the Welch Tourist in its 1903 eatalogue.

If the Union Automobile Co., of Union City, Ind., has as many strong points in its Union automobile as it has in the style and attractiveness of its catalogue, success is assured.

The Jones-Corbin Co., of Philadelphia, Pa., has a distinctively handsome little catalogue of its 1903 models.



THE READERS'

CHANGING IGNITION SYSTEM

Doniphan, Wis .- Editor Motor Age-I have a gasoline automobile using wipe spark ignition, operated by an auto-sparker, without batteries. Is it advisable to change to the jump spark system, and could I use my auto-sparker with any jump spark coil or would I have to have a special coil? I had a peculiar mishap on the road recently. I was making a nice run when the machine stopped, and I worked for an hour to get it started. . After examining everything, I finally took the carbureter off the machine, took it apart and found that it had sucked in a piece of twine from somewhere and it had wound around the needle valve point as smooth as thread on a spool ,and shut off the feed. I think I will never try to run again without using a screen on the air inlet of the carbureter.—HARRY WILSON.

The jump spark system of ignition is more used than the wipe spark, and seems to give more satisfactory results, especially where speed is concerned. An auto-sparker will operate a jump spark coil successfully if properly applied. Jump spark ignition requires more careful and a higher form of insulation than used with the wipe spark system—on account of the extremely high voltage.

DEGREE OF COMPRESSION

Decatur, Ill.—Editor Motor Age—Will you please enlighten me through your columns on the following point: What ratio should there be between the total cubic inches of gas drawn in by the piston and the total cubic inches of space in the combustion chamber to obtain a compression of between 60 and 70 pounds to the square inch? This contemplates using the ordinary suction inlet valve used on bicycle motors. I am building a 3 by 3-inch motor, but have not yet made the pattern for the head. It will have 9½-inch fly wheel with perhaps more weight in the rim than is usual, and will be 5 inches wide over all.—W. R. S.

The usual compression for gasoline motors is about four atmospheres, which gives about 45 gauge adiabatic—calculated—pressure and 59.7 pounds isothermal or heat pressure after compression. Seventy pounds gauge or adiabatic pressure will have a compression of 57.6 atmospheres and an isothermal pressure of 84.7 pounds. One-fourth of the piston displacement or 5.29 cubic inches should be the volume of capacity of the combustion chamber.

TIMING THE IGNITION

DeKalb, III.—Editor Motor Age—I am more or less familiar with a gas engine, but do not understand what is done when the spark is advanced or retarded. Of course the words themselves convey some meaning, but I would be pleased to learn through your columns what is done to make the spark occur early or late. It seems to me that the motor would back-fire instead of increasing in speed when the spark occurs earlier. Would also like to know if I am correct in saying that the spark should occur an instant before the compression stroke is completed.—C. H.

CLEARING HOUSE

Advancing the spark means so regulating the spark as to start combustion at or before the highest point of compression is reached. Retarding refers to so timing the ignition that the explosion takes place after the compression has reached its highest point and has begun to reduce as the piston starts on the outstroke. In starting a motor the spark is set late-that is, retarded so there will be no danger of back-firing. As the speed of the motor increases and the momentum of the fly wheel becomes sufficient to carry it over against a premature explosion, the spark is set so far ahead that the explosion takes place before the highest point of compression is reached, thereby generating greater power and causing the speed to be increased to the greatest extent. While the motor is running at high speed the spark can safely be timed ahead, but if the same thing should be done when the motor was being started, back-firing would occur. To obtain the best results after the motor has obtained momentum the spark should take place somewhat ahead of the end of the stroke. The exact point depends entirely on the kind of motor, the speed at which it is traveling, and on the weight of fly wheel.

GASOLINE MOTOR VIBRATION

Boston, Mass.—Editor Motor Age—Will two 4½-horsepower two-cycle motors coupled together produce as much vibration as a single cylinder 6-horsepower, two-cycle, motor?—A. F.

The vibration depends on the manner in which the motors are connected. If the cranks of the double motor are set in line, so that both impulses take place at the same time, the vibration will be greater. If one crank is set opposite the other so that the pistons will travel in opposite directions the vibration will be minimized on account of the mechanical balance; there will be the vibration set up by the two explosions, but it will not amount to much. Care must be taken in connecting the two motors, if they are to work together, that the alignment is perfect. When using two cylinders in the manner suggested it is better to mount them on one base so that the bearings of the crank shaft may be maintained in line with one another at all times.

AN AIR-COOLED MOTOR

San Francisco, Cal.—Editor Motor Age—I want to build a 4½ by 5-inch air-cooled motor as light as possible. It is to have a speed of 2,400 revolutions per minute, a crank case 12 inches in diameter and 4 inches wide, and the whole volume is to be compressed to one-quarter. What weight of internal fly wheel should be used? What should be the diameter and lift of the valves? What power should this motor develop? What is the highest compression that can be used without premature ignition? Can it be compressed to one-sixth of the total volume?—M. B.

An air-cooled motor of the dimensions given above would be entirely too large to be practical if built in the ordinary manner and cooled by external radiating ribs. The largest air-cooled, high speed motor of this type in practi-

cal use is about 31 by 31 inches, running at 1,-200 revolutions per minute. This is said to give 3 horsepower. This gives a piston velocity of 650 feet per minute, which is about the limit at which such a motor can be run continuously. At the speed given-2,400 revolutions per minute—the piston velocity would be 2,000 feet per minute, which is out of all question. The weight of the fly wheel cannot be given unless the required compression in atmospheres is given. There should be about 11 inches diameter and at least 1 of an inch lift for the exhaust valve. The motor would develop about 5 horsepower at 750 revolutions per minute. One-sixth of the total volume would be rather too high a degree of compression for an air-cooled motor. One-fifth is the practical limit.

SECURING HIGH EFFICIENCY

Muncie, Ind.—Editor Motor Age—In constructing an air-cooled motor whose cylinder is 3 by 3 inches, fly wheels 9 inches in diameter and of 1½ inches face, what should the clearance space or the area of the compression chamber be to obtain the highest power and best results?—M. H.

The highest power would be obtained by raising the compression to the highest possible point, but the best practical results are sometimes secured by not getting the highest possible power out of the motor, but by securing the required amount to accomplish the work under the varying conditions to which the machine is subjected. The compression in the average motor of this type is from 45 to 60 pounds, some few going a little higher. The space allowed in the combustion chamber should be what the builder thinks he requires, one-third or one-fourth of the piston displacement. The workmanship must be of the best in order to provide against excessive leakage. As there is always more or less leakage, no matter how much care is taken in the construction of the cylinder and piston, it is well to cut down the compression space somewhat to allow for loss due to mechanical defects. To provide against leakage, the rings should be re-turned after being slotted to make them a perfect fit. The slots should be made diagonally across the thin part of the ring, and the ring made to fit the groove in the piston closely, yet free to expand.

HOME MADE PILOT LIGHT

South Bend, Ind.—Editor Motor Age—A few weeks ago one of your correspondents asked about a generator and pilot light for a steam carriage, so I thought I would describe mine for the benefit of readers who are using carriages of a date previous to the advent of the Kelly, Hammond, Dayton, Studebaker, and other modern makes of generators and pilot lights.

I have a runabout which I purchased two years ago, but the firing up with a torch was always very annoying to me, as it would often leak at the gasoline union and then blaze up on the outside; so it required constant watching. Also when my carriage was standing in the wind for any length of time and the automatic regulator had shut down the fuel supply to low point, it was very apt to blow out, so on my return to the car I would find the fire out, the steam low and gasoline being forced in under full pressure. Not wishing to pay \$25 or \$30 for a generator, I contrived one at small expense.

I procured the top of a plumber's torch, such as used for thawing out pipes, or which painters use to burn off old paint, a few short pieces of 1-inch brass pipe and one union joint. Under my direction the "handy-man" at a repair shop put in a T joint between the main burner and the torch joint in the gasoline pipe. The rear opening or "peep hole" in the side of burner casing was then enlarged enough to let the end of the plumber's torch enter. This was pointed in such a way that it would direct the blaze against the gasoline supply pipe as it came down from the boiler and turned outward to the supply nozzle. The pipe from the T was carried down below the nozzle and then back to the torch, with the union joint on the horizontal part to hold the torch in place as well as to supply the fuel to it.

After the torch was in place I had the tinner make a little square box to fit over the torch and with a door in the middle to open when lighting. From the fuel cock for supplying the torch, I had a short piece of pipe put in with the lower end resting in the cup of my new torch. In operating, I first allow the cup to fill up below the torch, by allowing it to run through the last pipe mentioned. I then light this and it heats the torch, which can then be turned on by the handle the same as when used by a plumber. After the blaze has been going a short time I turn on the main burner and do not have to watch it every minute as when firing by the old torch system.

When I leave my carriage to stand for some time, I turn off the main burner and leave the torch burning a medium blaze. After 2 hours I will generally have 30 or 40 pounds of steam and will not find the water all gone from boiler, as when main burner is on. Thus I can start in a couple of minutes. I find, also, that I do not have trouble with back-firing with this apparatus, nor with blowing out of the burner in a high wind, while the slight noise it makes when burning alone is a very small objection to the many useful points I have found in it after a year's use. The total cost of this generator and pilot light was about \$4.—WILL U. MARTIN.

CYLINDER MATERIAL

Corona, Cal.—Editor Motor Age—What is the best material to use for cylinders and pistons for small air-cooled motors?—A. L. T.

Cast iron is the best known metal for use in cylinders of internal combustion engines, being capable of withstanding a greater heat with less distortion, and wearing longer than other metals. While anti-friction metals serve their purpose under certain conditions, none has been found to withstand wear and tear, such as occasioned in cylinders and pistons of hydro-carbon engines, owing to the high temperature under which the parts perform their work.

ONE OR TWO CYLINDERS

Syracuse, N. Y.—Editor Motor Age—I am contemplating building a gasoline motor for an automobile, but am undecided as whether to use a two-cylinder motor 4 by 4½ inches or a single cylinder motor, 5 by 6 inches. Which would give the better results and the greater horsepower?—S. A. W.

With a piston speed of 600 feet per minute the two-cylinder motor would develop about 7½ horsepower and would have a speed of 900 revolutions per minute. The single cylinder motor would, with the same piston speed,

give 5% horsepower, and have a speed of 600 revolutions per minute. If simplicity of construction is desired the single cylinder motor is to be preferred.

A MOTOR SUGGESTION

Waynesville, Ohio-Editor Motor Age-Some time ago I wrote you regarding a motor which received an explosion at each end of its stroke. Your reply was duly received, but not being acquainted with the construction of the Griffin motor mentioned I submit a design, upon which I wish a candid opinion. If the same line has been tried and proven unsuccessful I do not wish to waste time or money working upon it. I also wish to know what kind of a two-cycle motor it would make by dispensing with the lower heads and piston rods, using the usual long cup shaped pistons and connecting rods and a pump for forcing in the charge. The engine has two cylinders, one a regular steam engine cylinder, the other used as a double acting pump to draw the mixture from the carbureter and force it into the working cylinder. The cylinder head, pump head and exhaust valve chamber are cast in one piece and bolted to the pump and cylinder, each having flanges. The lower head has an extension cast upon it somewhat larger than the stroke of the engine. It will be accurately machined to fit the piston rod. The piston rod will have two grooves turned in it and two brass or bronze rings, the same as those used upon the ordinary piston, which are intended to act as a packing to allow the piston rod to work freely, but to make an air-tight fit between combustion chamber and the outside. The piston head and pump head are made somewhat longer than the stroke, so that they may be oiled by a lubricator being placed in sides of cylinder, and thus not being exposed to the force of the explosions or compression. The piston rod and the small rings that pass through the extension head are oiled in the same manner.

The intake valve will be of the usual pattern, which with its seat and guide will be screwed into the cylinder head, while the curved pipes connecting the cylinder with the pump will be attached by the usual pipe couplings. The pipes connecting the pump with the carbureter will have valves of ball or poppet style. The pump will be operated by an eccentric upon the crank shaft which can be shifted to give the pump as much lead as required. Fly wheels will be enclosed in the usual crank case and an extension to accommodate the increased length will be bolted to the cylinder, holding them rigid in the same manner as in a four-cylinder en-

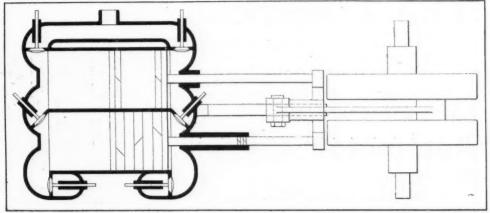
gine. The piston rods to have suitable guides to insure stiffness and perfect alignment. The engine is supposed to work in the following manner: After the piston and pump have been brought to the lowest point by applied power, which has drawn a charge from the carbureter into the upper pump chamber, upon turning the shaft further the charge is forced through the inlet valve and compressed. It is fired by a spark upon reaching the proper compression and the piston is driven down and the same operation repeated at the other end. The exhaust valve is opened when the piston nears the end of each stroke.—C. R. Sutton.

This type of motor, but with a single acting working cylinder and pump-with the two cranks set at 90 degrees-and without the exhaust valve, having instead a port uncovered by the piston at the end of its stroke, was invented and patented a good many years ago by Dugald Clerk of England. It did not in small power units develop much more power than the ordinary two-cycle motor of the same dimensions-at least not enough more to warrant the added complication and expense of construction. Reference to the works of Clerk, Donkin and Robinson on gas and oil engines, which can be found in almost any library, will fully explain this construction. The Griffin gas engine was built exactly like a steam engine, only with poppet instead of slide valves. It operates on the four-eycle principle, but with a scavenging stroke in which air was drawn into the cylinder after each exhaust stroke, and expelled before taking in a new charge, making it in reality a six-eycle motor, with two working strokes or impulses for every three revolutions of the motor crank shaft.

HOME MADE SPARK COIL

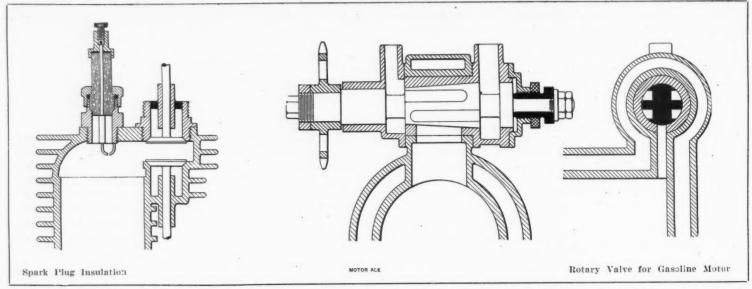
Topeka, Kan.—Editor Motor Age—Is there any good book on motor cycle and small motor construction? Will you kindly let me know the amount and size of wire for a jump spark coil?—W. M.

Iliffe & Sons, 3 St. Bride street, London, E. C., England, publish a book entitled Motor Cycles. The quantity and size of wire for a jump spark coil will depend on the size and length of the spark required, the number and kind of batteries to be used and the number of sparks per minute required of the coil. It is by far the better and cheaper way to purchase a jump spark coil from some reliable dealer, as even if all the information given were followed the coil would in all probability be a failure, except it were made by an electrician skilled in this particular line of work.



MOTOR A

MOTOR PROPOSED BY C. R. SUTTON



TO OBVIATE THE POPPET VALVE

Many efforts have been made to substitute some other form of valve for the usual poppet style of construction so generally used in internal combustion motors. Slide valves, piston valves and even rotary disk valves have been tried, but seemingly with little if any success, in the endeavor to replace the poppet valve. A form of rotary plug valve is illustrated which is of European construction and worthy of consideration on account of its simplicity and ingenious construction.

The left hand view is a longitudinal section of the valve and a partial cross section of the combustion chamber of which the valve chamber is an integral part. The right hand view is a cross section of the valve and a partial longitudinal section through the combustion chamber end of the cylinder.

The admission and exhaust chamber bodies form bearings for the valve, and are located on either side of the valve chamber or casing. The admission passage is located on the left and the exhaust passage on the right hand side of the valve chamber. The exhaust chamber casting also forms the body for the port portion of the valve, so that in case of undue wear or damage it may be quickly and cheaply replaced. The taper portion of the valve has four slots which form the ports for the admission and discharge of the gases, two for the admission and two for the exhaust.

The lower slot in the right hand view is the exhaust port and puts the cylinder in connection with the exhaust passage at the proper time. The upper slot is the admission port, which in a like manner puts the cylinder in connection with the admission passage. The valve has double ports—that is, two sets of admission and exhaust slots on its periphery. The valve spindle is shown driven by a sprocket wheel, but may be operated in any other suitable manner. Instead of being geared two-to-one, as usual, on account of the valve having four slots, in pairs diametrically opposite each other, the valve is timed to rotate only one revolution to four of the motor.

An advantage possessed by this valve is that the travel or movement of the valve is uniform throughout the entire time of opening and closing the ports. On the right hand end of the valve spindle is a threaded bushing with a lock nut, which screws into a cap or cover over the valve bearing in the exhaust passage casting. It is to adjust the seating of the taper part of the valve in case of wear, in order to make a gas-tight joint at all times. The washer and lock nuts on the threaded portion of the right hand end of the valve spindle prevent the taper part of the valve from being wedged in its seat.

SPARK PLUG INSULATION

Trouble is often experienced with the porcelain or lava insulation of spark plugs used in air-cooled motors, on account of the intense heat generated by the combustion of the gases in the cylinder causing the porcelain or lava either to crack from a sudden change in temperature or to slowly disintegrate from the effects of the continued intense heat. The plug illustrated is designed

to overcome these troubles by disposing the insulating core away from direct contact with the source of heat.

Instead of the insulating core projecting through the metal body of the plug as usual, it is set back so as to form a short tube or chamber, and the insulated terminal has an enlarged part in this chamber, in the lower end of which is located one of the platinum points of the plug. The result of this construction is said to be that a small portion of dead or inert gas is always left in the small chamber, thus preventing the insulation from being affected by direct contact with the flame of combustion.

An internally threaded bushing holds the insulation in place in the body of the plug, which is the reverse of the construction usually used—there being an externally threaded bushing which screws into, instead of over, the upper part of the plug body.

NORMAL MOTOR SPEED

In reply to the question about motor speeds, permit me to say that the speed ratio between the motor shaft and the driving wheels is not based upon any number of motor shaft revolutions. If the motor makes four turns to one of the rear axle the ratio is four to one, and no number of revolutions need be stated. If motors ran at a fixed speed under a governor like stationary motors, the motor speed would be an essential feature, but with a flexible motor having a wide range there is no such thing as normal speed and no reason for stating one.—C. E. Duryea.

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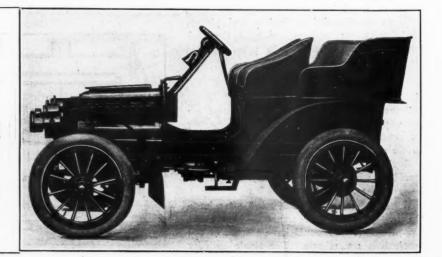
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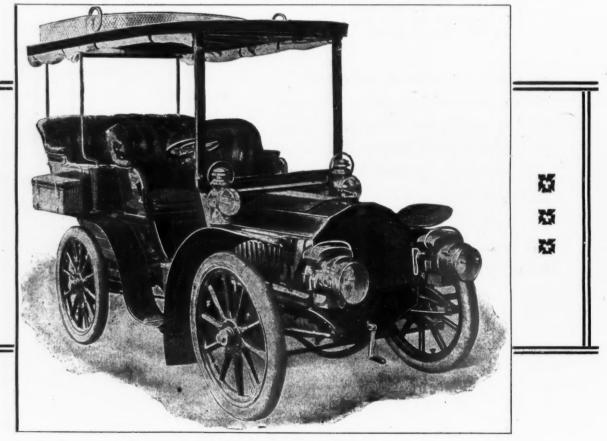
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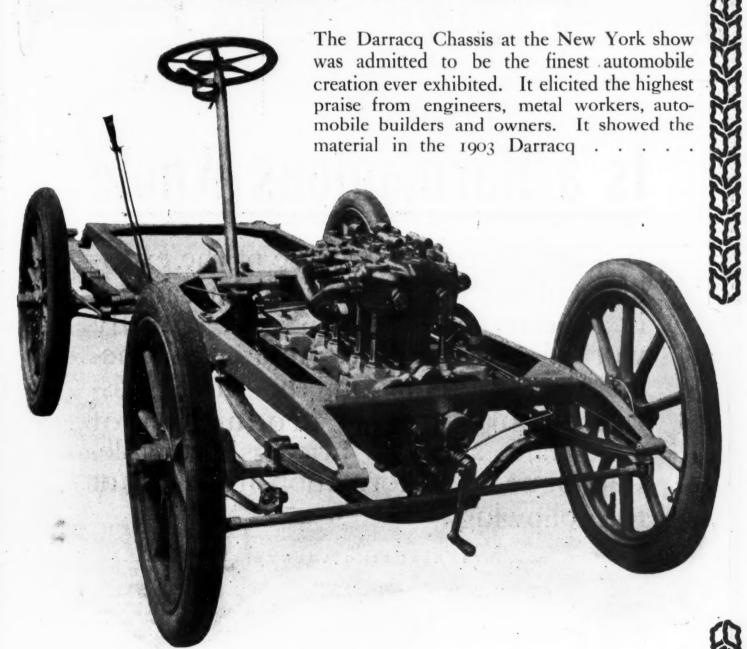
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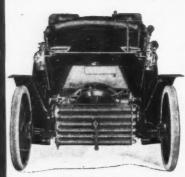
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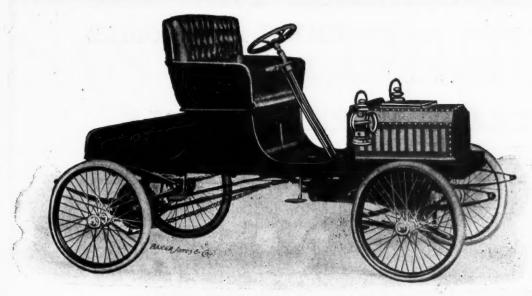
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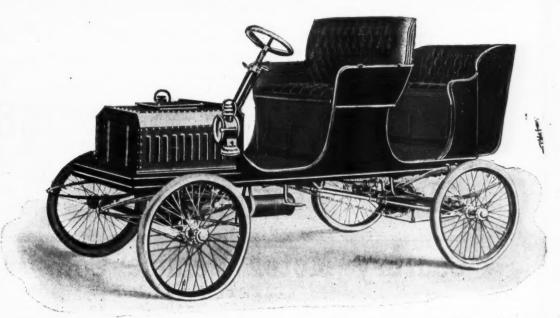
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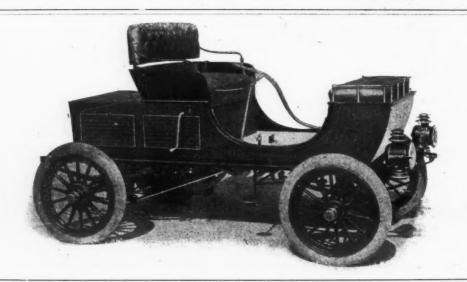
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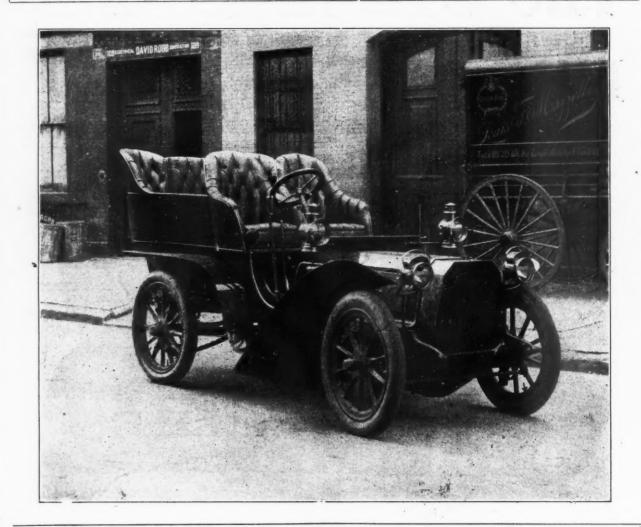
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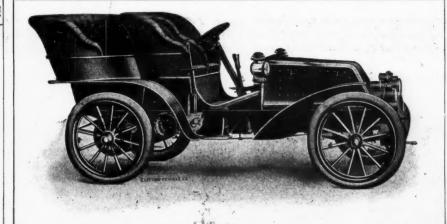
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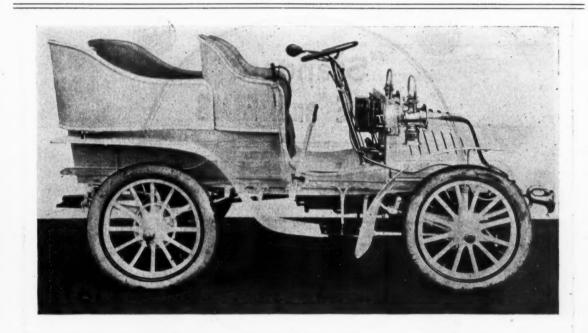
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All of these engines are of the medium speed variety, and tested—when they are tested—under the same conditions and with similar apparatus. Excepting only the body, tires, and spark coil, every part of the

Rambler

Touring Car is made in our own factory, subject to every test and supervision that experience has suggested. Every engine is tested before being assembled in the carriage, and it is impossible to build a better or more powerful engine of its type and size than that used in the



Is it necessary to say any more about horse power?





Model-de-Luxe
Of Motor Cars . . .

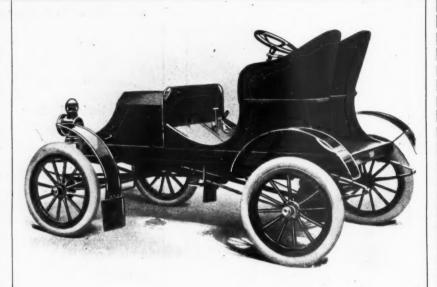
Write for Catalogue.

It Was the Feature of THE NEW YORK SHOW

It is the Feature of THE CHICAGO SHOW

Am highly satisfied and would not think of purchasing or recommending any other American built car.—S. G. AVERELL.

The vehicle is provided with wheel steering and individual seats—a feature seldom found in vehicles of the light or medium class.—Horseless Age, January 28, 1903.



A Gentlemen's Roadster Full of Ginger and Snap



FROM SCIENTIFIC AMERICAN

JANUARY 31, 1903

"The interior size of each cylinder is 3¼ inches, and the ports and valves are readily accessible. All portions are well balanced and jarring is avoided, since there is an explosion at every fourth part of a revolution. At 1,000 revolutions the car travels at the rate of 20 miles per hour, and a rate of 30 miles can be attained.

hour, and a rate of 30 miles can be attained.

"The four cylinders, aided by a large fly wheel, give a very constant torque, and allow of such effectual throttle control of the motor, that but two speeds ahead are needed. The ignition outfit consists of a dynamo, driven from the fly wheel by a bevel friction pulley, and two cells of storage battery. But one spark coil is used, the secondary current being switched to the proper spark plugs by means of sectors on the two-to-one shaft that carries on its end the commutator for primary current. The advantage of an air-cooled motor of this kind without auxiliary cooling appliances is self evident."

H. H. FRANKLIN MFG. CO., Syracuse, N. Y.

AGENTS

CHICAGO—Ralph Temple & Austrian Co., 295 Wabash Ave. New York—American Automobile Storage Co., 40 West 60th St. RHODE ISLAND—William A. Robinson, Woonsocket, R. I. LOUISVILLE—Sutcliffe & Co., 330 Main St. PITTSBURG—Seely Mfg. Co., 17 Baum, St. BOSTON—A. R. Bangs, 66 Stanhope St. DENVER—Felker Cycle Co., 18th & Stout St.
BUFFALO—W. C. Jaynes Automobile Co., 873 Main St.
INDIANAPOLIS—Fisher Automobile Co., Cyclorama Place.
PHILADELPHIA—Quaker City Automobile Co., 138 N. Broad St.
TROY—James Lucey, 359 Fulton St.
ALBANY—James Lucey, 167 N. Pearl St.

GOODRICH CLINCHER AUTOMOBILE —TIRES—

Original American Clincher Leads

There were more Goodrich Clincher Double Tube Automobile Tires fitted to machines on exhibition at Madison Square Garden Automobile Show, Jan. 17-24, than any other individual make of Clincher Double Tube style of tire.

Important! With hardly an exception, all machines at Show using OUR Clincher Tires were Heavy Touring Cars of High Power and Speed, requiring Tires of exceptional strength and quality. That is why Goodrich Clinchers were made the tire equipment. They have been thoroughly tested and their superior merits acknowledged. Write for booklet of testimonials, mailed to any one upon application.

Here is the Record Winton Motor Carriage Company, 4 Machines White Sewing Machine Company, 5 "

bile Company, Geo. N. Pierce Company, Spaulding Motor Car Company, H. P. Hall Motor Company, Moyea Automobile Company, one machine each. Baker Motor Vehicle Company, 6 machines, ALL fitted with Palmer Special Speed Automobile

Tires, OUR Make.

Ajax Motor Company, 2 machines, fitted with Goodrich Single Tube Motor Tires.

RECAPITULATION

Goodrich Clincher Tires equipped . 47 Machines Palmer Special Tires equipped . 6 "Goodrich Single Tube Tires equipped 2 "

Total, 55 Machines

THE B. F. GOODRICH COMPANY

Factories, - Akron, Ohio

- BRANCHES: -

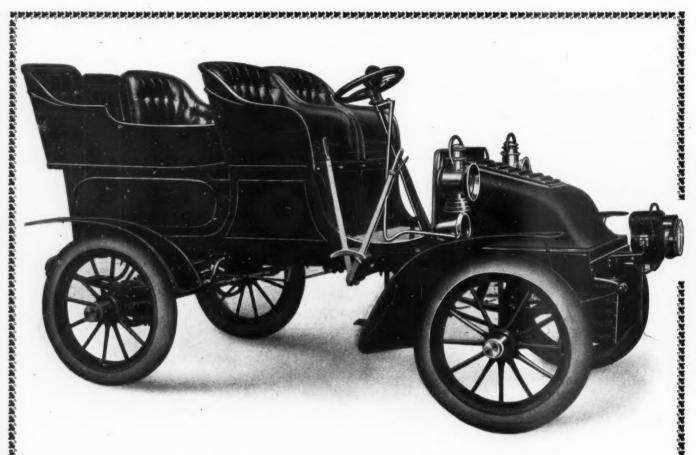
NEW YORK, 66-68 Reade Street CHICAGO, 141 Lake Street SAN FRANCISCO, 392 Mission Street PHILADELPHIA, 922 Arch Street DETROIT, 80 E. Congress Street BUFFALO, 9 West Huron Street DENVER, 1444 Curtis Street BOSTON, 157 Summer Street LONDON, ENG., 7 Snow Hill, E. C.

The Cleveland



For style, power, comfort, reliability, hill climbing, rough road work—equal to the cars of twice the price. In ease of care and control, expense of maintenance, accessibility of parts, simplicity of construction and general utility, it is without a peer.





PRICE \$1750, F. O. B., CLEVELAND



Strong armoured wood frame; heavy artillery wheels; deep divided front seat; roomy detachable tonneau; extraordinarily elastic springs; double opposed cylinder horizontal motor; strong, simple, fool proof sliding grar transmission, three speeds forward and one reverse, direct on high speed; solid live rear axle; all year round carbureter; best upholstery and finish.



THE CLEVELAND AUTOMOBILE CO.
16, 18 and 20 Lake Street, Cleveland, Ohio, U. S. A.

THE CLEVELAND ROADSTER

A Runabout of a larger growth; stronger, more durable, more powerful, more comfortable. Just as simple and just as easy to operate.





PRICE, \$750, F. O. B. CLEVELAND



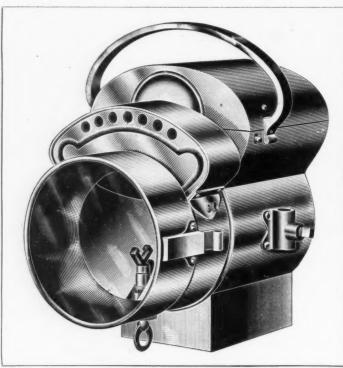
Rectangular reachless frame; long springs; single cylinder motor; transmission without internal gears; three independent brakes; solid live rear axle; artillery wheels; detachable tires; wide, comfortable seat; highest possible finish.



THE CLEVELAND AUTOMOBILE COMPANY

16, 18 and 20 Lake Street, Cleveland, Ohio, U. S. A.

Columbia Auto-Headlight



THIS IS TO THE AUTOMOBILE WHAT

Most Economical and Greatest Light Giver on the Market.

Burns 10 Hours Without Recharging.

The Very Latest and the Very Best.

The Public Has Had 5
Years Experience With
Our System of Generation
and Has Unanimously
Voted It an Unqualified
Success.

Guaranteed.

Gas Lamps for Bicycles, Buggies and Motor Vehicles.

Small Lamp Furnished in Nickel Plate or Gun Metal.

Large Lamp Brass Finish Throughout.

All of Our Models Work Upon the Same Principle.

The Gas Pressure and Height of Flame Controlled by Gas Cock.

The Water Feed Controlled by the Gas Pressure.

Burns Out Carbide Completely.

Can Use Charge Repeatedly
Until Exhausted.

Balanced Draught.

No Blowing Out or Flickering of Flame.

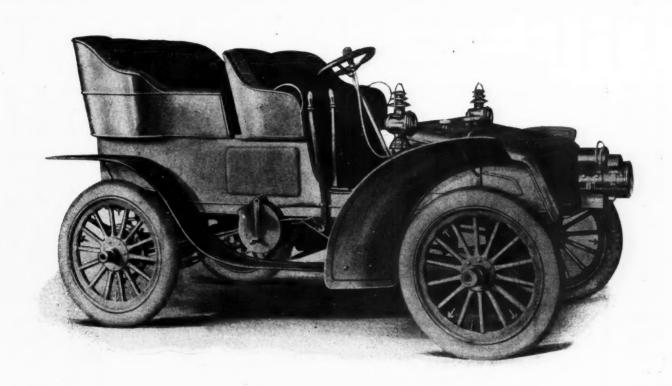


THIS HAS BEEN TO THE BICYCLE



HINE-WATT MFG. CO.

60 WABASH AVENUE, CHICAGO, ILL.



PACKARD

Our single-cylinder motors have all been of large bore, and of comparatively slow speed. This combination gives the very greatest possible economy, and accounts for their extremely long life. With the same auxiliaries in the way of carbureters and electrical devices, it stands to reason that the demands of the big, slow moving single-cylinder engine will be but a fraction of the requirements of the higher speed multi-cylinder motor. This very fact explains how it is possible to get so much greater mileage, with the same care and attention, out of this single-cylinder engine than can be obtained from any other combination. This is a decided advantage, and cannot be overestimated.

"ASK THE MAN WHO OWNS ONE"-He Knows.

PACKARD MOTOR CAR CO.

WARREN, & & & OHIO, U. S. A.

第二十分,1000年

THE SEARCHMONT

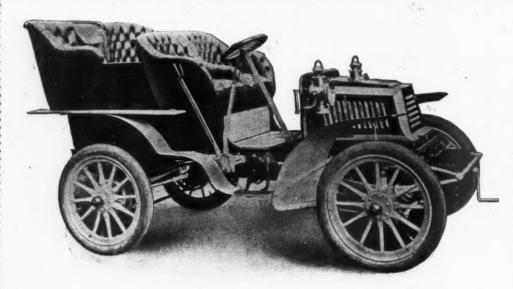
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1903 MODEL. TYPE VII.

AMERICAN Engineers

AMERICAN Ingenuity

AMERICAN Methods

AMERICAN Material

AMERICAN Mechanics

AMERICAN Workmanship

AMERICAN Brains

AMERICAN Money combined with

AMERICAN Enterprise

Have Produced

America's LEADING Automobile

and the price is only \$2,500—not \$5,000 or \$10,000. See the New Searchmont at the Chicago Automobile Show. It will pay you to examine it before purchasing.

Searchmont Automobile Co.

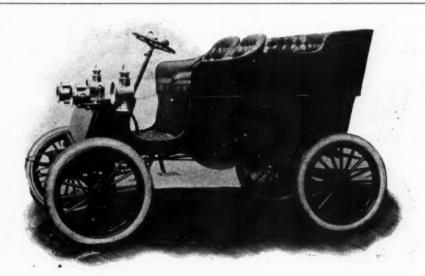
PHILADELPHIA, U. S. A.

GITHENS BROS. CO., Chicago Agents, 1412 Michigan Ave., Chicago.

THE SEARCHMONT

FREDONIA

FOR DAILY USE



WEIGHT 1450 LBS., ALL ON: PRICE, \$1250

A CUP WINNER

WE ARE ONE OF THE SEVENTEEN.

Better speak quick if you want early deliveries *

We have also a Runabout, Price \$1,000 IT WILL PAY YOU TO LOOK US UP.

THE FREDONIA MANUFACTURING CO. YOUNGSTOWN, :: :: :: :: OHIO, U. S. A.

FOR PLEASURE OR FOR PROFIT

The ELMORE

IS ALWAYS READY



10 H. P. TONNEAU

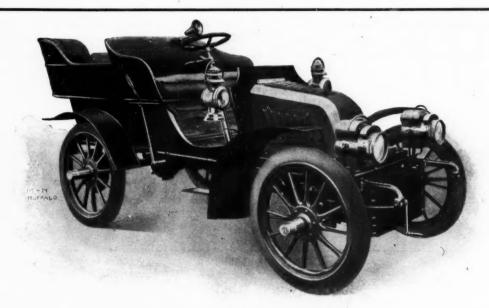
The ELMORE fully meets the exacting requirements of a PHYSICIAN, for it can be depended upon to go when required.



Our Double Cylinder Motor is simpler than any other make of Single Cylinder Motor. We can tell you a lot of good things about it. :: Send for our catalog. Agencies now being placed.

ELMORE MFG. COMPANY

CLYDE, OHIO, U. S. A.



ARROW MOTOR CAR

Pierce Motorettes

Built to Run All the Time!

New Models for 1903 will be exhibited at the Chicago Automobile Show, Spaces 11 and 12.

rrow Motor

Includes all the latest improvements in Moderate Speed, Moderate Weight, and Moderate Price Tonneau Models.

SIMPLE IN OPERATION, UNEQUALLED IN WORK-MANSHIP AND FINISH, ELEGANT IN DESIGN.

THE GEORGE N. PIERCE CO. Makers, BUFFALO, NEW YORK.



MOTORETTE

GENERAL SELLING AGENTS:

New York Banker Bros. Co. Philadelphia.

Pittsburg. Automobile Headquarters, Boston.
Miller-Mundy Motor Car Co., Utica, N. Y.
R. W. Whipple, Binghamton, N. Y.
Conrad Bros., Scranton, Pa.
Toledo Motor Carriage Co., Toledo, Ohio.
R. V. Connerat, Savannah, Ga.

E. P. Moriarity & Co., Kansas City, Mo.

THERE'S NO RISK

in buying an automobile if you decide on

The General



A RUNABOUT that stands the test of everyday use. Full 8 horse pow r Double Cylinder Gasoline Engine. Evenly balanced cylinders prevent vibration—a perfect muffler insures complete silence. Easy riding springs—a luxurious seat. Agents in all principal cities.

The General Automobile & Mfg. Co.

Cleveland, Ohio.

THE

BAKER ELECTRIC



There is Character in Design and that Refinement in the Finish of

BAKER ELECTRICS

That Places Them in a Distinctive Class



THE STANHOPE

The Pleasing Lines and Serviceable Qualities are Endorsed and Approved

CHERRICAL CONTRACTOR C

....THE BAKER REPUTATION IS DISTINCT AND WIDESPREAD

The Dealer of Experience Carries a Line of Electrics.

THE BAKERS

Have just that touch of Refinement and Attractiveness that puts you in touch with the Best People.



THE RUNABOUT

A Line to Us Will Bring Printed Matter.

THE BAKER MOTOR VEHICLE CO.

CLEVELAND, OHIO, U. S. A.



IT NEVER BALKS

But is thoroughly practical, and fills all requirements, on all kinds of roads and under all conditions

The Hoffman Motor Car \$800 \$950

IS EQUAL TO ANY \$2,500.00 AUTOMOBILE MADE.

8 Horse Power Gasoline Engine, clash gear, the simplest, most easily controlled, and most reliable machine on the market. Combination single seat or double seat for 2 or 4 persons. Can be changed in 15 seconds. :: Sales Agents Wanted. :: Send for catalogue.

HOFFMAN AUTOMOBILE & MFG. COMPANY

1515 Lake Street, - - CLEVELAND, OHIO.

MEAD CYCLE CO., 1243-45 Wabash Avenue, Sole Chicago Agents.

A Few Out of Many.

HINSTALE SMITH, Pres

ARTHUR PARKS SMITH, Sec. and Treas.

The Automotor Co.

Spring field, Mass. Oct. 20.1902

Mr. H. Kirkpatrice Hauford Rubber Horks Co

We shought it might be of interest Llear sii. to you, to learn, that the car we raw m the New York - Boston Peliabelety Run 65 was equipped with Dunlap tires, that we had no trouble with them on the run The tires had been previously run about. one thousand miles and we took the our from Hartford Come to Men yester west all through the contest and return to Hartford without even pumping upthe tires your very truly automotor les. archin Phritte

Brown, Thomson & Co.

Hartford, Conn. Nov. 5, 1902.

Hartford Rubber Works Co., CITY.

Gentlemen: -

We thought it might interest you to know our experience with the Dunlop Tires in our Automobile Dept.

You may remember at the commencement of the season when specifying these for some of our different Autos, some of the men in our Department were somewhat skeptical in regard to the results

We specified Dunlop tires on about one-third of our vehicles and have been watching the results with a great deal of interest, as in former seasons we were in constant trouble on account more than pleased with the results we have obtained from the Dunlop-Tires and according to our ideas, and experience they are the only practical tires for an Automobile at the present time. We find they are giving excellent satisfaction and our customers by carrying along an extra inner tube can always make a quick and permanent repair on the road with very little trouble. This is something we other cannot say of any single tube or any, make of inner tube tires we have had experience with. We shall surely insist upon having all of our Automobiles for next season equipped with Dunlop Tires.

Yours truly, Brown . Thomson & Co.

W. L. L.

Publishors, Publishers of AMBTICAN MADMINIST Wookly, POWBL Monthly. Printers. Oct. 25, 1902. Fitgiavois.

10038

FOURNIER-SEARCHMONT AUTOMOBILE COMPANY NORTH AMERICAN BUILDING

Oct. 21/02.

The Hartford Rubber Works Co..

The Contest Committee of the Automobile Club of America used my Tonneau Autocar as the Committee's car on the recent reliability run, New York to Boston and return.

My car had been run about 100 miles on a set of Dunlop tires of your make before it started for Boston. It undoubtedly had the hardest usage of any car in the run, because, we saw the entire line of contestants off in the morning, and at noon, passed them on the road, and saw them arrive. Besides this the car was run for other purposes in Boston and at other controls, making from the time it left my house until its return 606 miles. The car only weighs 1400 pounds and it carried four men weighing 745 pounds.

We never touched the tires from start to stop except in one instance, when the car stood on a side hill and it looked as if one of

instance, when the car stood on a side hill and it looked as if one of the back tires was partly deflated. We put on the pump and tried to pump it up but could not. The tire was all right. The car came how The car came home

pump it up but could not. The tire was all right. The car came home without a single stop for tire trouble and is ready for further business.

I write this voluntary letter, because I must say I was a little skeptical about the tires on this run, with this load, and to guard against troubles carried two extra shoes and a box full of inner tubes, which are still waiting for a failure.

Very truly yours.

Hartford Rubber Co.,

Hartford, Conn.

Gentlemen . --

We are in receipt of your esteemed favor of the 18th, asking us what success we had with your tires on the Searchmonts 42 C, 67 C and 76 C, in the Reliability Run, all of which were fitted with Dunlop 3 1/2 x 32 inch tires.

We are very glad to be able to tell you that we had no trouble whatever with them, and you will find from the observers' records that not a single stop was made for tire difficulties of any kind. This is certainly a great record for your tires, and one of which you may be justly proud.

Yours very truly.

Fournier-Searchmont Automobile Co.

wo Sash

Sales Manager,

A Few Out of Many.

John Wanamaker

Broadway 4. 4 Ave. 9 4 and 10 4 Sts.

New York, Oct. 24th, 1902

Hartford Rubber Works Co.,

Hartford, Conn.

Mr. H. Kirpatrick,

As an aftermath of the endurance run held under the auspices of the Automobile Club of America. I think it only just to yourselves to tell you that the Searchmont cars entered by our House were fitted with Dunlop tires; there were three of these machines entered in the run and all three drove from N. Y. to Boston and return without so much as attaching a pump to the valve on the tires, and it also may interest you to know that the tires were as clean and as free from cuts and signs of wear at the finish, as any tires which went through that 500 mile run. The - statement of the fact is more interesting to you than any comments which I could make on the subject, so I will leave that part for you to do as you may see fit.

Thanking you for supplying us with so good a tire on this run, we remain

Yours very truly,

JOHN WANAMAKER.

John Wanamaker City Hall Square;

Philadelphia, October 20, 1902

The Hartford Rubber Works Comp

Hartford, Conn.

Dear Sirs:-

Replying to yours of the 18th inst., asking us for our opinion of your "Dunlop" tires, would say that we cannot speak too highly of the good services they gave us in the recent "Reliability

We had entered in this run two Searchmont cars, and the Boston agent also had one Scarchmont in the Run. All three cars were equipped with your latest style of "Dunlop" tires 32 x 33-1/2, and all three came through without a single puncture or stop of any kind on account of tires or anything else. All the tires seemed to be in very good shape and look as though they could stand another run with just as little trouble

Congratulating you on your success, we are.

Yours truly.

JOHN WANAMAKER.

KNOX AUTOMOBILE COMPANY.

Springfield, Mass Oct. 20.

Hartford Rubber Works Co.,

Hartford, Conn.

Gentlemen: --

Yours of the 18th received and we are pleased to state that our two vehicles, which successfully completed the New York to Boston Reliability Contest were equipped with Dunlop tires. We had no trouble with them of any sort, no punctures, and did not even blow them up throughout the run. As far as we could judge they were in as perfect condition at the finish as they were at the start.

Knox Automobile Co. Hadnor

Dict. H. A. K.

ALBERT E SMITH President

H A KNOX Vice President

E H CUTLER Treasurer

KNOX AUTOMOBILE COMPANY

Springfield, Mass Nov. 25.

Hartford Rubber Works Co.,

Hartford, Conn.

Gentlemen: --

We have used your Dunlop tires, 30 x 3", exclusively on about 300 of our vehicles this year, and are pleased to state they have proved very satisfactory to us and to our customers. We believe they are the easiest riding double tube tire on the market Loday.

Yours very truly,

Knox Automobile Co.



THE OLDSMOBILE CO.

138 WEST 38 TH.ST.

New York, Oct. 24, 1902.

Hartford Rubber Works.Co..

Hartford, Conn.

Gentlemen: -

I wish to thank you for your congratulations on our success in the Endurance Contest and wish to say that we qualified for the President's Cup. The Dunlop Tires on both of the Oldsmobiles Which entered the Run, came through without any trouble whatever, and as for A 64 would say that these tires were not even inflated during the Run. We are still using these tires and so far they are giving excellent satisfaction.

Very truly yours.

OLDSMOBILE COMPANY.



Hartford Bubber Works Co.

Hartford, Conn.

Gentlemen: --

As you are already aware two of our carriages in the recent Automobile Endurance Contest from New York to Boston and return were equipped with your single tube Hartford Tires.

The exceptionally fine record of our machines necessarily speaks well for your goods, and we will add that our operators are unanimous in saying that if they were equipped for another Non-Stop Contest run under the same rules and regulations they would surely choose Hartford Sungle Tube Tires.

Yours truly,

Dic. by G. L.

Laneworthisles.

H. B. SHATTUCK & SON AUTOMOBILES 239 COLUMBUS AVE. BOSTON, MASS

Boston, Mass., Oct. 20, 1902.

Hartford Rubber Works,

Automobile Dept.,

Hartford, Conn.

Gentlemen: -

We are pleased to inform you of the very satisfactory results obtained from our three cars in the Endurance Contest, all fitted with Dunlop tires. These three cars went through without any tire trouble whatsoever. This, we assure you, is very pleasing to us, and we think will be of interest to the general public. We have been using Dunlop tires now for the past year on our Autocars and have found them very satisfactory and reliable.

Yours truly,

H. B. Shattuck & Son.

Per Benj. Smith, Mgr.

N. J. AUTOMOBILE CO., GENERAL AGENTS. No. 8 Central Avenue,

Newark, N. J., Oct. 20, 1902.

THE HARTFORD RUBBER WORKS CO.

Hartford, Conn.

Dear Sirs :-

It affords me great pleasure to inform you that I acted as observer for Mr. A. P. Smith, who operated an Automotor made in Springfield, Mass. This machine was fitted with Dunlop Tires which gave us absolutely no trouble during the late New York and Boston Endurance Test. I also wish to state that at no time during the trip did I see any contestants that were using your tires in trouble.

Yours very truly.

DURYEA POWER COMPANY, "HOORPO

AUTOMOBILES, MOTORS, LAUNCHES.

N. River and Hockley Streets, READING, PA. Dec. 17, 1902.

Hartford Rubber Wks., Co., Hartford, Conn.

Gentlemen:Sometime ago we reported on a set of Dunlon tires driven by us in the run from Reading to Boston and return, accompanying the Reliability contest. We have since run those tires another thousand miles and had no trouble of any kind with them. They were pumped up at 1750 miles for the first time since leaving the factory. Their light weight, easy riding qualities and splendid service on our light weight vehicles please us very much, as you will readily understand.

Very truly,

DURYBA POWER CO

CED/EAR.

Dict. B. S. J. E. B.

DURYEA POWER COMPANY, INCORPORATED

AUTOMOBILES, MOTORS, LAUNCHES.

READING, PA. Oct. 25, 1902.

Hartford, Rubber Wks. Co., Hartford, Conn.

It may interest you to know that we used Dunlop tires 30" and 36" x 3" on our three wheeled phaeton, which we drove from Reading to Boston and return accompanying the New York-Boston Reliability contest. We covered with this vehicle 1100 miles, 1000 being made in ten consecutive days and had no tire troubles whatever. Further the tires showed no abuse and very little wear. We are using several other kinds of tires but pin our faith to Dun-

Very truly, DURYEA POWER CO.

CED/EAR.

6 EDwya V. P.

N. J. AUTOMOBILE Co., GENERAL AGENTS, No. 8 Central Avenue,

> Newark, N. J., Oct. 21, 190 2.

Mr. W. W. Kirkpatrick,

% Hartford Rubber Works Co.,

Hartford, Conn.

Dear Sir:-

It was my good fortune to be a guest on the recent Reliability contest to Boston and return. Part of the time I rode with Mr. Shattuck and the balance on the Committee car. This gave me unlimited opportunities for investigating the different care, As we were almost always the last to start and the first to finish, passing all the contestants en-route; it affords me much pleasure to congratulate you heartily in the way your tires stood up. While we met with lots of victims of tire troubles, in no case did I see anyone repairing Dunlops.

With kind regards,

Diot. W.J.S.

Dict. L.S.W.

G&J TRES

Make the most practical and satisfactory automobile equipment. They will stand hard service; are resilient and speedy; easily repaired if punctured—and they don't puncture easily.



Detachable tires are being adopted by all automobile makers for 1903. G & J automobile tires stand at the head of the class as reliable tires of unquestioned quality.

Chicago Show: Feb. 14-21.
SPACES 144-145.

25255 @ 4226866

G&JIRECO.

INDIANAPOLIS, IND., # # U. S. A.

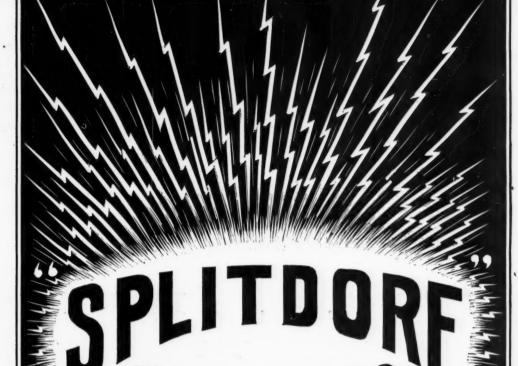


THE VERDICT OF BOTH SHOWS

MADE IN AMERICA SINCE 1858

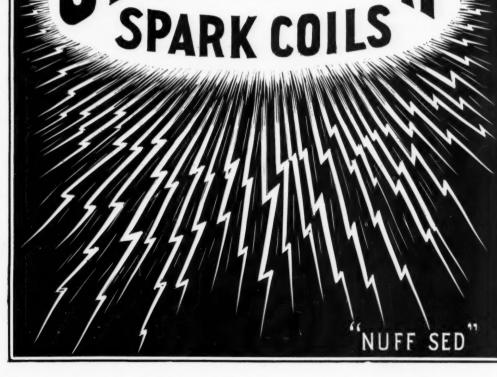














Splitdorf Coils are the Best



THEY ARE THE STANDARD

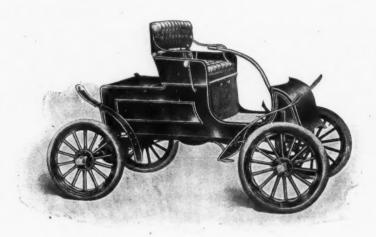
C. F. SPLITDORF,

17-25 Vandewater St., New York.



The Sturdy Northern

A trifle higher in price than the cheapest, but it is better to buy experience at the start than to pay for it year after year.



Early orders
will secure
early deliveries.
Write now for
catalogue and
agency proposition.

Exhibited Chicago Show - Spaces 81-82-83.

NORTHERN MFG. CO., : DETROIT, MICH.

THE SANDUSKY

The Business Man's Friend

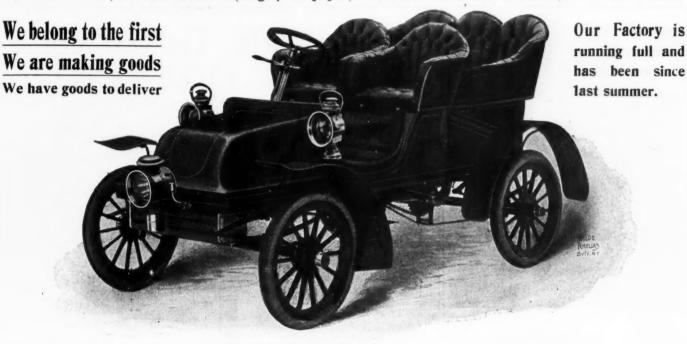
Always Ready To Go

A Neat, Light Runabout built for American roads. Mud, Sand and Hills shrink before it. A Model of Simplicity, Quiet, Safe, Powerful and Economical. The Carriage we build has been on the Road for Three Years, and therefore is no experiment. We are now prepared to put them on the market, and respectfully invite your correspondence.

The Sandusky Automobile Co.

SANDUSKY, OHIO, U. S. A.

TWO ENTIRELY DIFFERENT An Actual Active Capacity Now Producing Automobiles PROPOSITIONS A CAPACITY (largely on paper) TO PRODUCE ACTUAL AUTOMOBILES



THOMAS TONNEAU, MODEL 17. Price \$1,250.

Can you make money and hold customers without filling orders? CAN YOU AFFORD TO RUN THIS RISK? You are cordially invited to visit our factory, such an inspection will convince you that OUR PROPOSITION IS A SAFE AND PROFITABLE ONE.

1202 NIAGARA STREET, BUFFALO, N. Y.

AT LAST, A PERFECT SUCCESS.

Works and Operates as Easy as Gasoline. No Danger.

Three Minutes to start. No smoke or



Studebaker Generator and Burnell Burner.

CHICAGO SHOW in operation on

Jaxon Cars, Spaces 108 and 109.

The Barton Flash Boiler Co.

Space 159.

ORDERS BOOKED at SHOW FOR QUICK DELIVERY AT SPACES 108 and 100.

NO CLOGGING SMOKE DANGER BLOWING OUT CONDENSATION

DOUBLES YOUR MILEAGE.

FULLY GUARANTEÉD.

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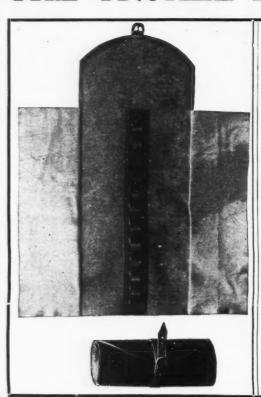
Studebaker & Burnell,

293 Wabash Ave..

The Reputation and Success of Our Goods for Three Seasons Should Appeal to Both Manufacturer and Rider. Ø Ø CHICAGO.



THE TROXEL AUTOMOBILE TOOL ROLL



Complete IN EVERY DETAIL.

Made.....

OF THE FINEST QUALITY OF LEATHER.

No. 1 Holds 12 Tools.

No. 2 Holds 7 Tools.

Every Automobilist

SHOULD ORDER ONE AT ONCE. THE TROXEL MOTOR CYCLE SADDLE



The only Motor Cycle Saddle that combines Ease and Durability and will positively retain its original shape.

Three Spiral Springs.

Troxel Manuf'g Co., ELYRIA, OHIO.

SOLE SALESMEN:

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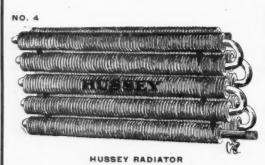
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Hussey's Automobile Parts...



SHOWING BODY AND RUNNING GEAR READY FOR POWER PLANT

WE ALSO MANUFACTURE A SINGLE CYLINDER MOTOR, 5x6; CIRCULATING PUMP, 4½x1; TANKS OF ALL KINDS; MULTIPLE OILERS; SPRING HANGERS; SOLID STEER-ING WHEELS (If Preferred); BRASS, BRONZE AND ALUMINUM CASTINGS



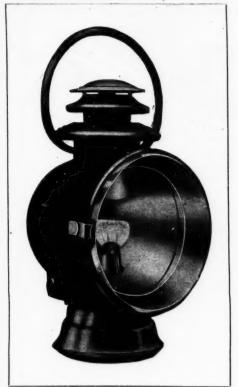
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ATWOOD "STAY-LIT" LAMP

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THE "STAY-LIT" has earned its high reputation and is the best and swellest Automobile Lamp on the Market. The large number of contracts taken indicates that the trade knows a good thing.

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WE DEMONSTRATED TO ALL COMERS AND DID BUSINESS.

A RATIONAL
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AT A
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\$1,750
NO VARIATIONS



SIMPLICITY STRENGTH

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We have appointed the following agents and will consider a few more:

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Place Your Order





For Ignition Apparatus

Until you have seen our NEW AUTOMATIC COIL which changes from a vibrator to a plain coil automatically. New Little Wonder Dynamo with starting battery in base. New Covered Spark Plug which prevents water or oil from short-circuiting the plug on outside. New Pocket Ammeter which gives the output of batteries correctly and our whole line of A YEAR IN ADVANCE Jump Spark Ignition Apparatus.

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THE PREMIER

A CAR AS GOOD AS ITS NAME

PLEASING IN APPEARANCE
FULL OF GOOD IDEAS
MANY NEW FEATURES



MANY GOOD AND
PROVEN PRACTICES
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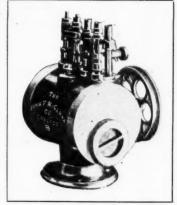
A CAR BUILT FOR SERVICE

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Mechanical "Force-Feed" Oiling Machines



With use of these machines no thought or care whatever is required touching lubrication. When the Automobile starts the oiling begins automatically at every point about the machine requiring oil. The action is contiouous in ratio with the speed of the machine and stops when the Auto mobile stops.

The quantity of oil required at each point is pre-determined from practice and when once set for the determined quantity, the action thereafter is entirely automatic. All oil cups, "squirt cans," "splash" cases and other "traps and calamaties" may be joyfully thrown away.

That oil economy is secured by these machines over any other method of Lubrication is a well known fact and reduced friction will add further

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Write for Catalogue and Estimates.

Will Exhibit at the Chicago Automobile Show, Space 163.

Parties desiring disinterested information regarding merit, please write us and we will place them in correspondence with manufacturers in their line of business using these machines.

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Making Electric Automobiles Practical Substituting Acid for Alkaline

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Is never fitted with the highest priced and tested fittings. Therefore, do not expect to find on cheap Automobiles

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It is a fair criterion to judge by, is it not?—especially when we tell you that Midgley wheels cost a little more than others, and there are none "just as good."

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The 1903 Burner

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That tube is continuous, of steel. The tube below connects with each coil, giving an even distribution of gas.



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No back-firing even if the burner is red hot.

The generator is clean, quick, simple, strong. No smoke or flaring. No drip cup needed. Encased in aluminum. Wintry blasts have no evil effect. If I A A great and scientific combination.

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KELLY BURNERS Give Satisfaction

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KELLY BURNERS In All Sizes.

How About Your Runabout?

HAVE YOU AN EFFICIENT MOTOR?

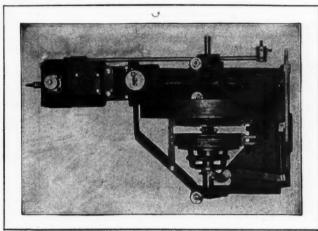
We have and are anxious to tell you how you can improve your construction. We advocate their use in 1000-lb. vehicles, but they are doing 20 miles per hour in machines that weigh 1250. Transmission providing two speeds, forward and reverse, fitted to shaft, thus making the motor ready to install in the vehicle.



Come and investigate. It will be time and money well spent.

The prices are in keeping with the quality.







If you are looking for cheap goods, look elsewhere.

We try to and do make the best motor of its class.



We provide engines without transmissions if desired. Also Champion transmissions, differential gears, roller bearing axles, chains, sprockets, artillery wheels, tires, etc. Our new catalogue is now being compiled. Send your name and address for one when ready for mailing.

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\$750 CRESTMOBILE \$750

With Any Other Low Priced Car

Will Prove it Superior in Every Detail.

Air Cooled

Shaft Drive No Vibration Light Weight Steel Frame Simplest Mechanism.



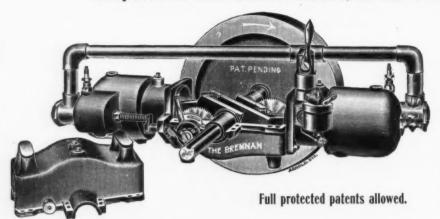
Capacity 100 Miles
30 Miles per Hour
Weight 750 lbs.
5 Brake Horse Power
Long Wheel Base
Maximum Comfort

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Brennan Standard Motor

This is the Motor, that was purchased by buyers from all parts of the United States, at the New York Show



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Dear Sir:—After carefully considering various makes of motors, at the show, we have decided on your motor. Enclosed, please find check for sample order on 8 H. P. motor with accessories. Ship, without delay.

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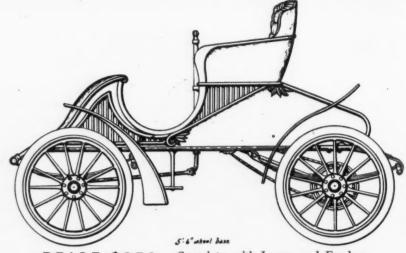
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WYOMA GASOLINE MOTOR. Single Cylinder, 8 H. P., 135 pounds. Double Cylinder, 14 H. P., 265 pounds.

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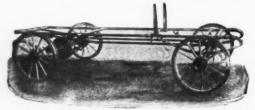
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Our Motors are of French Type, Water Cooled, and Equal in Finish and Service to Best Foreign Makes.

The Differential Gear has Manganese Bronze Bevel Gear. Fitted for either 1½, 1½ or 1½ inch axles. Is made for Direct Drive, Rod Transmission, and also with Chain Sprocket.



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3 Speeds forward and 1 Reverse.

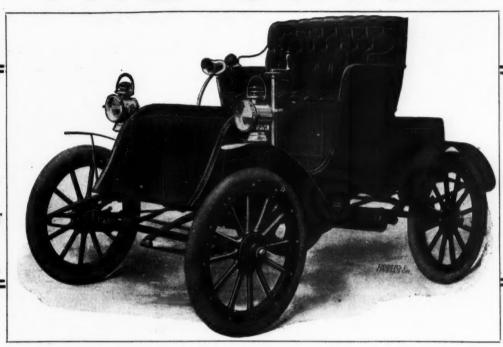
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\$1,200

Combination

Two and Four

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Simple and

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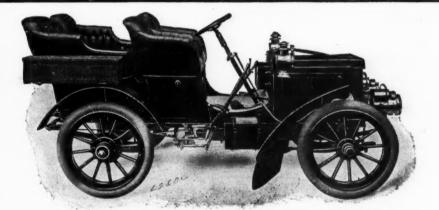
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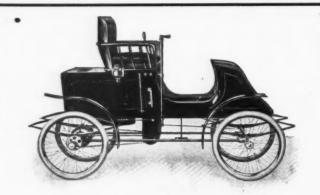
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One year ahead of them all, 16 h. p. Motors mounted on front. Slide gears. Universal shaft, bevel gear transmission. Governed Motor, foot control. Catalog tells the rest, mailed on request.

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Made so Perfectly that it is Appreciated by the Experienced Driver

THEY WHO KNOW IT ARE LOUD IN ITS PRAISE

IF YOU HAVE HAD TROUBLES, GET A PRESCOTT THEY SATISFY

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FOUR PASSENGER

The Fanning ir Cooled

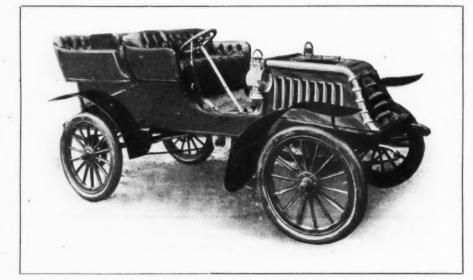
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French Pattern Tonneau

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> Handsome in Appearance and Operated by a



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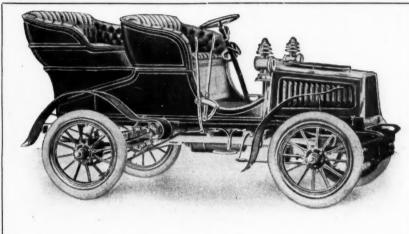
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Motor.—Two-cylinder vertical type, cylinders 4¼ inches by 5¼ inches.

Normal Powen.—Twelve actual brake horse-power at 900 revolutions.

IGNITION.—Jump spark; dry battery circuit.

Transmission.—Sliding gear; 3 speeds—6, 14 and 30 miles per hour.

and 30 miles per hour.

Double Chain Drive.—1¼-inch roller chains direct to rear wheels.

Brakes.—Direct acting on hubs of rear wheels.

Wheels.—Wood, 30 inches in diameter.

Tires.—Pneumatic, 30 inches x 3½ inches; detachable.

Bearings.—Ball.

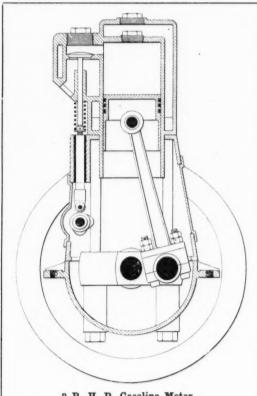
Differential.—On counter-shaft; solid rear axle.

Wheel Base.—Seventy-six inches.

Wheel Base.—Seventy-six inches,
Track.—Fifty-four inches,
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A Good Gasoline Motor is not such an easy thing to build as some people think, but we make them.

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We make two sizes of motors: Two and four cylinders of 8 and 16 B. H. P. respectively.

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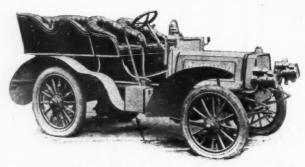
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DO THE REST



A Rochet Schneider Chassis fitted with one of our Aluminum Bodies, Steel Fenders, Lamp Props and Steps.

> YOU can save money and WE can give you the finest finished car that skill and experience can produce.

We are also prepared to furnish American Manufacturers with either

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10 H. P. Decauville. Price, \$3,250.

High power for weight is one of the many attractive features, and insures great speed and hill-climbing ability.

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A car with a reputation—not an untried proposition. Built more strongly than any American car and therefore better for American roads.



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Before you select your tire equipment you should know all about the quality and character of the tire—therefore this absolutely correct recapitulation of tire equipment on cars exhibited at the NEW YORK and CLEVELAND shows is proof conclusive that DIAMOND TIRES are the acknowledged leaders of all.

NEW	YORK	SHOW	
	STACHABLE	SINGLE TUBE	TOTAL
DIAMOND	49	22	71
SECOND	46	8	54
THIRD	29	0	29
FOURTH	29 25	0	29 25
FIFTH	21	0	21
SIXTH	1	9	10
SEVENTH	ō	8	8
ЕІСИТИ	Ö	8	8
NINTH	. 0	5	5
TENTH	1		1
MISCELLANEOUS -	3	6	9
Solids			24
GRAND TOTAL,			265

MAKE		DETACHABLE	SINGLE TUBE	TOTAL
DIAMOND -		12	7	19
SECOND	-	8	i	9
THIRD		7	Ö	7
FOURTH	-	7	Ö	7
FIFTH		2	0	2
SIXTH	-	0	1	1
SEVENTH	-	Ö	i	1
MISCELLANEOUS		0	1	1
SOLIDS	-			1
GRAND	Tor.	AL		- 48

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DIAMOND TIRES were the equipment upon cars ranging from the light runabout to the heavy-TOURING CAR of high speed—showing construction to be such as to cover innumerable requirements and be proof against a large range of conditions. A natural law now demands for tires an analysis as careful as that given any other commodity.

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\$750

With Tonneau \$850

The Best Proposition for 1903

THE FOLLOWING AGENCY LIST PROVES IT.

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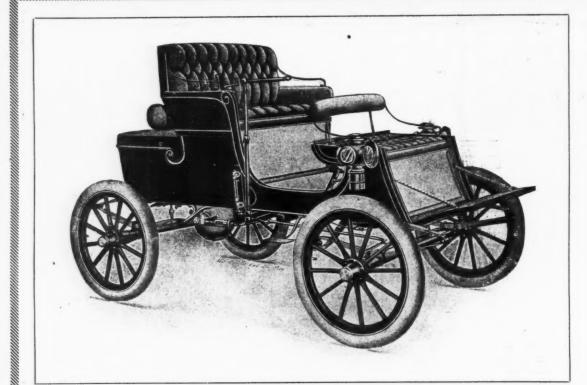
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Steam Made the **Best Showing** in all of the Recent **Trials**



The Jackson Automobile Co., Jackson, Mich.

See Us at Spaces 108-109 Chicago Show.

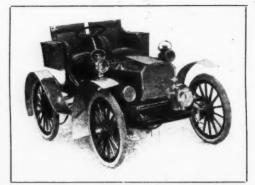
Embodies all of the best features of all of the best steam cars and many

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Jones-Corbin Gasoline Cars

* * * FEATURES * * *

Wheel Base, 6 ft. 6 in.; Wood Wheels Cone Clutch; Sliding Gear. Transmission, 3 Speeds Forward and Reverse, 1st, 12 miles; 2d, 20 miles; 3d, 35 miles. # # # #



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THE MOORE AIR PUMP

This pump is tested to put up from 80 to 100 pounds compressed air in 2½ gallon tank in 2½ minutes, under 250 pounds steam pressure. It can be placed either vertically or horizontally

The Moore Boiler Feeder

Half the pleasure of a trip in the Automobile is missed unless you have a boiler feeder that will help you on hills and soft roads, and in the MOORE you have such a pump

The Moore Combination Pump

Combines all the good points of both single pumps .:

Manufactured by the

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Known to the trade as the

BEASLEY ELASTIC TIRE



Built on the truss principle, it's strong and the strain is equally distributed.

Amply resilient yet defies destruction or disabling by puncture.

Can be used until completely worn out.

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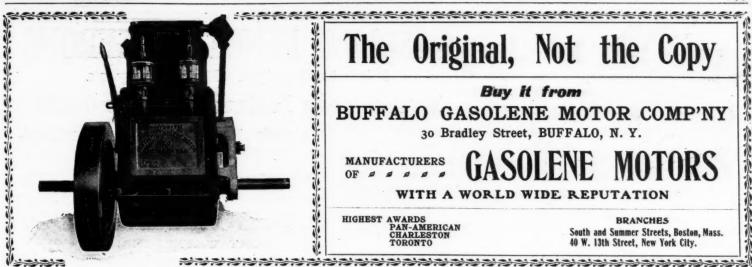
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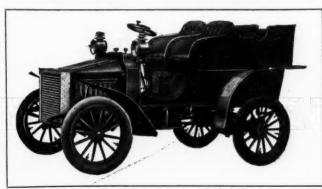
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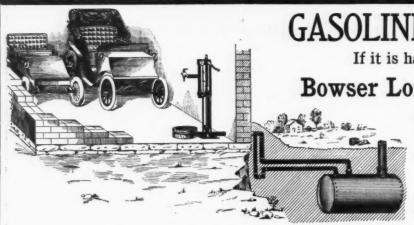
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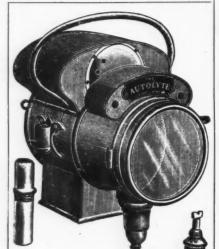
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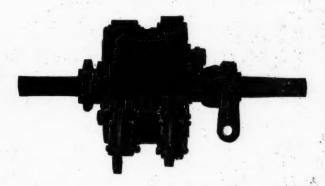
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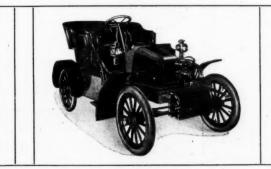
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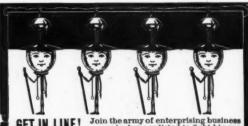
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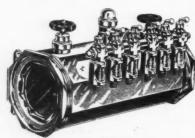
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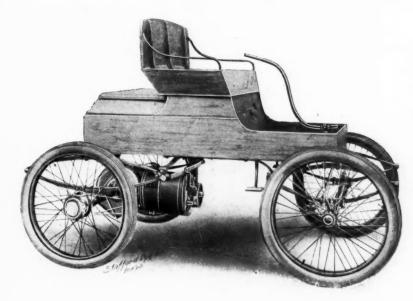
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